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THE TESTING OF HALL'S PERMANENT INCOME HYPOTHESIS: A CASE STUDY OF PAKISTAN

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ABSTRACT

The objective of this study is to test the Hall's permanent income hypothesis for Pakistan using annual data from 1992 to 2010. The basic model of permanent income hypothesis (PIH) showed the validity of absolute income hypothesis (AIH) while the Campbell and Mankiw (1990) consumption model suggested that the proportion of forward looking consumers in total population is 32 percent and the remaining consumers are backward looking. Therefore in Pakistan, there is larger fluctuation in per capita income and small opportunity for consumption smoothing.

Key Words: Permanent Income Hypothesis, Absolute Income Hypothesis, Consumption Smoothing.

INTRODUCTION

According to permanent income hypothesis (PIH) the consumption of individuals depend upon their permanent income rather than current income. To test the PIH, Friedman (1957) suggested that individuals can estimate their permanent income on the basis of current income lags. Thus Friedman introduces lags in consumption function. Lucas (1976) argued that lags of current income cannot explain the current consumption. In response to this critique, Hall (1978) presented theory of rational expectation-permanent income hypothesis (RE-PIH). He argued that current consumption is adequate to estimate future consumption because any information which affects future consumption is already included in current consumption. Hall further explained that the disposable income, both current and past, have no effect on future consumption. Therefore according to Hall, consumption follows a random walk.

Flavine (1981), Hayashi (1982), Bernanke (1985), Campbell and Mankiw (1990), Rao (2005)**,** Rao (2007), have tested the Hall's random walk hypothesis but their results do not even partly support the RE-PIH.

In Pakistan, Khalid (1994) explicitly tested the Hall's random walk hypothesis and he concluded that Hall's random walk hypothesis is not valid for Pakistan. Khalid (1994) neither used Euler equation approach nor the Campbell and Mankiw (1990) consumption model, which separates the proportion of forward looking consumers from backward looking consumers. This study uses both

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Euler equation approach and Campbell and Mankiw (1990) consumption model to test the PIH for Pakistan and hence presents a contribution to existing literature. The rest of the paper is organized as follows, section two describes methodology and data, section three presents the empirical results and section four offers conclusion.

METHODOLOGY AND DATA DESCRIPTION

The pioneer of testing PIH under the rational expectation with Euler equation was Hall (1978). According to PIH aggregate consumption function can be represented by the individual's decision. Thus the typical individual maximizes:

$$MaxE_t \sum_{i=0}^{T-t}(1+\delta)^{-i}U(C_{t+i}) \qquad U' > 0, U'' < 0 \qquad (1)$$

Subject to $\sum_{i=0}^{T-t}(1+r)^{-i}(C_{t+i} - YL_{t+i}) = W_t$

Where

$C_t = $ Private consumption at period t

$E_t = $ Expectations subject to information at period t

$T = $ Life time of the individual

$W_t = $ Wealth excluding human capital at period t

$YL_t = $ Disposable labor income at period t

$\delta = $ Rate of subjective time preference

$r = $ Real rate of interest

The first order condition (Euler equation) can be obtained from the maximization of above equation (1) as:

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

This equation says that marginal utility of today with constant multiple is the best forecast of marginal utility of tomorrow.

If we assume that marginal utility is linear and $r = \delta$, then we find that current consumption is the best predictor in the next period consumption:

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

This in turn implies:

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

Where ε_t is a rational forecasting error and innovation in permanent income. Thus, according to this arrangement of the permanent income hypothesis, the change in consumption is cannot be forecasted.

To test the basic model PIH with the data, for this purpose the econometric model is as under:

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

Where ΔC_t is log difference of real consumption, ΔY_t is log difference of current real labor income, ε_t is random error. If $\beta = 0$ this shows the validity of PIH, otherwise it shows that current income can effect current consumption.

In the above model we assume that all consumers are forward looking. But in the real world it may not be possible. Therefore, we also used the Campbell and Mankiw (1990) consumption model to find out the separate proportion of forward looking and backward looking consumers.

Campbell and Mankiw (1990) Consumption Model

The Campbell and Mankiw model assumes that the proportion of $(1-\lambda)$ individuals are forward looking and satisfy the PIH while a proportion of (λ) follow the "rule of thumb" and consume their current income. Furthermore, the Campbell and Mankiw consumption model also allows some intertemporal substitution (δ) for the forward looking consumers. Thus the Campbell and Mankiw consumption model is:

$$\Delta C_t = \alpha + \lambda \Delta Y_t + (1-\lambda)\delta.r_t + \varepsilon_t \qquad\qquad (6)$$

Where r is the real interest rate, ε_t is the random term.

Data Description

The study is based on an annual data from 1992 to 2010 and is taken from the Internationals Financial Statistics (IFS) database. All the data series are used in their real denominations. The real consumption is used as a dependent variable. Real consumption is computed by adjusting nominal consumption with consumption deflator. Gross domestic product (GDP) is used as a proxy for labor income because GDP is highly correlated with labor income; and its real value is obtained by deflating it with consumption deflator. The discount rate is used as a proxy of real interest rate after inflation adjustment and Consumer Price Index (CPI) is used as the consumption deflator.

EMPIRICAL RESULTS

The estimated result of the basic model of PIH and Campbell and Mankiw consumption model are presented in table 1. Three different econometric methods i.e. Ordinary Least Square (OLS), Instrument-Variable (IV) and Non-Linear Least Squares (NLLS) were used to estimate equations (5) and (6). The third and fourth column of table 1 presents the results of basic model of PIH, which shows that there is strong and significant relationship between change in consumption and change in current income, these results are consistent with AIH. Thus, it indicates that the individuals' consumption strongly rely on their current income rather than their expected life time income. Therefore the results of Basic model of PIH show the inconsistency of PIH.

The above estimation assumes that all individuals are forward looking but in real world it may not be possible. Therefore, the study used the Campbell and Mankiw consumption model. The Campbell and Mankiw consumption model which includes both types of consumers: forward looking and backward looking. The best way to estimate the Campbell and Mankiw model is instrument-variable (IV) approach as suggested by Campbell and Mankiw (1990) because the error

term "ε_t" may be correlated with ΔY_t and due to this the OLS estimators will become inconsistent. The empirical results of the Campbell and Mankiw consumption model support the result of basic model of PIH. All three estimation methods indicated the presence of small number of forward looking individuals. The proportion of forward looking consumers is 32 percent, 22 percent, and 33 percent of the total population, shown by the OLS, IV and NLLS regression respectively. Therefore both the basic model of PIH and Campbell and Mankiw model show the violation of PIH for Pakistan. The real interest rate appears with a negative sign but it is statistically insignificant in all OLS, IV and NLLS regression. Therefore in the case of Pakistan current income plays a very vital role in determination of individuals' consumption. Thus consumption does not follow a random walk in Pakistan.

CONCLUSION

This study tested the Hall's permanent income hypothesis of Pakistan using the basic model of PIH and Campbell and Mankiw (1990) consumption model. The basic model of PIH showed that the consumers' consumption in Pakistan depends upon their current income rather than permanent income hence indicated the validity of the AIH. The same results are found by the Campbell and Mankiw (1990) consumption model. On the basis of Campbell and Mankiw consumption model we found that the proportion of backward looking consumers is much greater than the forward looking consumers, only 33 percent of consumers' consumption choices are based on permanent income and the remaining follow the rule of thumb. The real interest rate has a correct sign but statistically insignificant in all three models simultaneously. It is hoped this study results will encourage further work on micro data analysis of PIH.

Table 1 Estimation of Basic Model of PIH and Campbell and Mankiw Consumption Model

$$\Delta C_t = \alpha + \beta \Delta Y_t + \varepsilon_t \qquad \Delta C_t = \alpha + \lambda \Delta Y_t + (1-\lambda)\delta.r_t + \varepsilon_t$$

	α	β	α	λ	$(1-\lambda)\delta$	δ	SE
1.OLS							
Coefficient	1558	0.7400	2045	0.7830	-0.0490	-0.3358	0.0230
T. Ratio	2540	14.081	-0.7630	17.0860	-0.9330	------	------
Probability	0.8010	0.0000	0.4589	0.0000	0.3575	------	------
2.IV							
Coefficient	------	------	2412	0.8880	-0.0709	-0.3193	0.0245
T. Ratio	------	------	-0.222	11.084	-1.8536	------	------
Probability	------	------	0.8257	0.0000	0.0747	------	------
3.IV-NLLS							
Coefficient	------	------	-0.0148	0.777	-0.0424	-0.1273	0.0280
T. Ratio	------	------	-0.4306	6.2221	-0.7449	------	------
Probability	------	------	0.6778	0.0003	0.4776	------	------

Note: For the estimation of IV and IV-NLLS model we used $y_{t-1}, y_{t-2}, y_{t-3}, r_{t-1}, r_{t-2}$ and r_{t-3} as instrumental variables

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