Permanent Income Hypothesis, Myopia and Liquidity Constraints: A Case Study of Pakistan

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Abstract  
In this paper, it is attempted to test the permanent income hypothesis (PIH) for Pakistan. If the PIH is not valid for Pakistan the study also attempts to find out the reasons for rejection of PIH. Hall’s random walk model (1978) and Campbell and Mankiw model (1990) are used to test for the validity of PIH. The results of this study indicate the strong validity of absolute income hypothesis (AIH) rather than PIH. Therefore, to find out the reasons for the rejection of the PIH in Pakistan we used Shea (1995) model. The results of the Shea (1995) model rejected the symmetric relationship between consumption and expected income and provide a little evidence of existence of liquidity constraints.

Keywords: Permanent Income Hypothesis; Absolute Income Hypothesis; Symmetric Relationship; Liquidity Constraints

I. Introduction  
The empirical puzzle of Keynes psychological law of consumption provides the opportunity to extend the consumption literature. To answer Kuznets’s (1946) empirical puzzle, different economists introduced their consumption theories such as relative income hypothesis (RIH) by Duesenberry (1948), life cycle hypothesis (LCH) by Modigliani and Brumbergh (1954) and permanent income hypothesis (PIH) by Friedman (1957). According to Duesenberry (1948) consumption of the individual depends upon its relative income rather than its absolute income. But according to PIH consumption of individual which is explained by its permanent rather than its relative income and current income, while the LCH forwards the same argument in a different prospective. According to LCH the consumption of individual is explained by its expected life time income, so the PIH and LCH share the same optimizations model and conclusion. But in empirical work the PIH is more popular than LCH, while the RIH is not tested widely because of unavailability of data for key variables.

To test the PIH, Friedman (1957) estimated the permanent income by using the distributive lags of current income. Lucas (1976) postulated that the lags of current income do not explain the current consumption. In the response to Lucas (1976) critique, Hall (1978) showed that without current consumption other variables have no
explanatory power to predict future consumption i.e. change in consumption is a random walk.

Hall’s random walk hypothesis implies that unexpected change in permanent income can affect current consumption. Several empirical studies tested the Hall’s random walk hypothesis. The most notable among them are Flavin (1981), Hall and Mishkin (1982), Hayashi (1982), Bernanke (1985), Campbell and Mankiw (1990), but their results were not supported by Hall’s Random walk hypothesis. They argued that individual’s consumption is sensitive to current income rather than permanent income and Flavin (1981) gave the name to such phenomenon as “excess sensitivity of consumption”.

Before Campbell and Mankiw (1990) economist believe that an economy can satisfy one consumption hypothesis at a time but in (1990) Campbell and Mankiw showed that in an economy consumers can satisfy both absolute income hypothesis (AIH) and permanent income hypothesis (PIH) simultaneously. Campbell and Mankiw divided consumers in two different segments i.e. ‘λ’ and (1- λ), λ shows the proportion of backward looking consumers, while (1- λ) shows the proportion of forward looking consumers. Khalid (1994) tested the PIH for Pakistan, using distributive lag model. His results show that PIH is not valid in Pakistan but he did not show any reason for the failure of PIH. Since in consumption literature, there are two reasons for the rejection of PIH, one is liquidity constraints (Zeldes (1989)), and another is myopia (Runkle (1991)). In case of liquidity constraints consumers are unable to borrow against their future income but they can save freely when their current income increases. Therefore, liquidity constraints show an asymmetric relationship between consumption and expected income. But myopia consumption follows current income, because in myopia, consumers respond equally to predictable income increases and decreases. Therefore, myopia causes symmetric relationship between consumption and expected income.

Flavin (1985), Zeldes (1989) Jappelli & Pagano (1989) rejected the PIH, their results showed that the excess sensitivity of consumption to current income is due to liquidity constraints. Paz (2006) tested the PIH for Brazil and rejected the PIH due to the presence of both liquidity constraints and myopia.

Gomes and Paz (2010) tested the life cycle permanent income hypothesis for Brazil, Colombia, Peru and Venezuela. Gomes and Paz (2010) found liquidity constrained consumers in Brazil and Colombia, and perverse asymmetry in Peru while their results were remained uninformative about consumption in Venezuela.

This is the first study to test the PIH with the help of Hall’s random walk model (1978) and Campbell and Mankiw model (1990) in case of Pakistan. Besides that this study is also interested to find out the rejection reasons of the PIH in Pakistan, if AIH is valid for Pakistan. The rest of the paper is organized as follows: Section two offers methodology and data description, section three presents the results and discussion and section four summarizes conclusion.
II. Methodology and Data Description

In consumption literature there are several consumption theories, namely, absolute income hypothesis (AIH), permanent income hypothesis (PIH), life cycle income hypothesis (LCH) and random walk hypothesis (RWH).

This study considers the Hall (1978) random walk model to test the absolute income and permanent income hypothesis with rational expectation for Pakistan. Adopting the Hall (1978) that the typical forward looking consumer maximizes:

\[ E_t \sum_{s=0}^{\infty} (1 + \delta)^{-s} u(C_{t+s}) \quad u' > 0, u'' < 0 \quad (1.1) \]

\( E_t \) = expectation at period \( t \)
\( C_t \) = private consumption at period \( t \)
\( u \) = utility function of individual
\( \delta \) = rate of subjective time preference

If the representative individual can lend and borrow at a real interest rate \( r \), then the first order condition from the above maximization is:

\[ E_t u'(C_{t+1}) = \left( \frac{1 + \delta}{1 + r} \right) u'(C_t) \quad (1.2) \]

If we assume that \( r = \delta \) and the marginal utility \( (u') \) is linear or log linear then we finds that the current consumption is the best forecast of future consumption in the next period, i.e.:

\[ C_{t+1} = C_t + \varepsilon_t \quad (1.3) \]

or

\[ E_t C_{t+1} = C_t \quad (1.4) \]

Therefore,

\[ \Delta C_t = \varepsilon_t \quad (1.5) \]

Where \( \varepsilon_t \) is random error, the above equation (1.5) implies that all the available information is used in current period to forecast the future consumption.

a. Econometric Model

To test the PIH, for this purpose the study uses the following model:

\[ \Delta C_t = \alpha + \lambda \Delta Y_t + \varepsilon_t \quad (1.6) \]

Where \( \Delta C_t \) consumption growth, \( \Delta Y_t \) is expected income growth. When \( \lambda = 0 \) then PIH will be satisfied.
The Campbell and Mankiw (1990) allow the interest rate in the above equation (1.6) for intertemporal substitution for the forward looking consumer. Then the augmented model becomes:

\[ \Delta C_t = \mu + \lambda \Delta Y_t + \sigma r_t + \varepsilon_t \]  

(1.7)

Where \( r_t \) is real expected interest rate.

The PIH postulated that predictable changes in income have no affect on consumption but consumption can only be affected through interest rate. Therefore, if \( \lambda = 0 \) it shows the validity of PIH. Under myopia, consumers consume a fixed share of current income. Therefore, consumption should respond symmetrically to the increases and decreases of expected income. While, under liquidity constraints, individual consumption should respond more strongly to increase of expected income than decrease of expected income. This asymmetrical behavior is because under the liquidity constraints, individuals cannot borrow but save freely. Following Shea (1995) model, in order to test the presence of liquidity constraints and myopia, following regression was used:

\[ \Delta C_t = \mu + \lambda_1 (POS_t) \Delta Y_t + \lambda_2 (NEG) \Delta Y_t + \sigma r_t + \varepsilon_t \]  

(1.8)

Where POS and NEG are dummies variables for periods in which \( \Delta Y_t > 0 \) and \( \Delta Y_t < 0 \) respectively. The PIH implies that both \( \lambda_1 = \lambda_2 = 0 \), under myopia the \( \lambda \)'s should be significant, equal and greater than zero, while in liquidity constraints implies that: \( \lambda_1 \) is positive, significant and greater than \( \lambda_2 \).

b. Data and Variables

The data is collected on annual basis from 1971 to 2010 at the International Financial Statistics (IFS) CD-ROM. The data consists of real disposable income, real consumption, real interest rate and consumer price index (CPI). The detail and definition of variables are as under:

Real Private Consumption
Nominal private consumption is used as a proxy of consumption. It includes both the consumption of durable and non-durable goods, but it does not include the government consumption of emerging economies. The real consumption was calculated by deflating nominal consumption with consumption deflator.

Labor Income
GDP is used as a proxy for labor income, because GDP is highly correlated with labor income; real value was obtained by deflating the nominal value with consumption deflator. Labor income is one of the major sources of current income. It is strongly positively related to the private consumption, due to this it is expected that the sign of labor income will be positive.
Real Interest Rate

Campbell and Mankiw (1990) used discount rate as the proxy of interest rate hence this study also used discount rate as a proxy of real interest rate after adjusting with inflation.

Consumption Deflator

The Consumer Price Index (CPI) is used as the consumption deflator. With the help of CPI we converted all nominal variables to their real counterparts.

III. Empirical Results

a. Descriptive Statistics

Table 1 Comparison of Consumptions Patterns of Pakistan with China and India

<table>
<thead>
<tr>
<th>Country Name</th>
<th>Pakistan</th>
<th>China</th>
<th>India</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean APC</td>
<td>0.73</td>
<td>0.58</td>
<td>0.67</td>
</tr>
<tr>
<td>Standard Deviation of APC</td>
<td>0.051</td>
<td>0.023</td>
<td>0.054</td>
</tr>
<tr>
<td>Mean Growth of Y</td>
<td>5.50</td>
<td>6.23</td>
<td>4.30</td>
</tr>
<tr>
<td>Standard Deviation of Growth in Y</td>
<td>5.40</td>
<td>1.20</td>
<td>4.29</td>
</tr>
<tr>
<td>Mean Growth of C</td>
<td>5.20</td>
<td>1.19</td>
<td>3.30</td>
</tr>
<tr>
<td>Standard Deviation in C</td>
<td>4.40</td>
<td>9.30</td>
<td>4.50</td>
</tr>
</tbody>
</table>

Where: APC is average propensity to consume, Y is gross domestic product and C is private consumption

Before the estimation of Hall’s (1978) and Campbell and Mankiw (1990) consumption model, first, we want to compare the average propensity to consume (APC) in Pakistan with China and India. This purpose can be achieved with the help of table 1 in which the APC, standard deviation of APC, average growth of income and consumption and their respective standard deviation for Pakistan, China and India are calculated. In table 1 the APC of Pakistan, China, India are 0.73, 0.58 and 0.67 respectively. There is pretty high difference between the APC of Pakistan and China while small difference between APC of Pakistan and India. The standard deviation of APC of China is very low than the standard deviation of Pakistan and India. The high standard deviation of APC of Pakistan and India suggests that current income in these countries might play an important role than permanent income while in China there is the possibility that the permanent income may play the major role in their individuals’ consumption choices. The larger variation in the Pakistan and India is due to the larger variation in the growth rate of their income. Therefore, modeling of consumption for Pakistan and India is a demanding task.

b. Inferential Statistics

Firstly, the study tests the PIH for Pakistan, by estimating the equations (1.6) and (1.7). Table 3 presents the empirical results of equation (1.6) and equation (1.7). These equations are estimated by using OLS and instrumental variables (IV) method. Equation (1.6) is estimated by applying the OLS method; the results of equation (1.6) show the strong validity of AIH for Pakistan. Therefore, consumption follows current income rather than permanent income. Both OLS and IV methods are used to estimate equation
Model 1, 2, 3, 4, and 5 are estimated by using the IV lists; first, second, third, fourth and fifth, offers by table 2.

Table 2 Lists of Instrumental Variables

<table>
<thead>
<tr>
<th>List</th>
<th>Instrumental variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>First list</td>
<td>$\Delta y_{t-2}, \ldots, \Delta y_{t-6}; r_{t-2}, \ldots, r_{t-6}$</td>
</tr>
<tr>
<td>Second list</td>
<td>$\Delta c_{t-2}, \ldots, \Delta c_{t-6}; r_{t-2}, \ldots, r_{t-6}$</td>
</tr>
<tr>
<td>Third list</td>
<td>$\Delta y_{t-2}, \ldots, \Delta y_{t-6}; \Delta c_{t-2}, \ldots, \Delta c_{t-6}; cy_{t-2}, \ldots, r_{t-2}, \ldots, r_{t-6}$</td>
</tr>
<tr>
<td>Fourth list</td>
<td>$\Delta i_{t-2}, \ldots, \Delta i_{t-6}; r_{t-2}, \ldots, r_{t-6}$</td>
</tr>
<tr>
<td>Fifth list</td>
<td>$\Delta i_{t-2}, \ldots, \Delta i_{t-6}; \Delta y_{t-2}, \ldots, \Delta y_{t-6}; \Delta c_{t-2}, \ldots, \Delta c_{t-6}; cy_{t-2}, \ldots, r_{t-2}, \ldots, r_{t-6}$</td>
</tr>
</tbody>
</table>

Note: $\Delta y =$ growth rate of real GDP, $r =$ discount rate minus change in CPI, $c \Delta =$ growth rate of real household consumption, $cy = \log$ of MPC, and $\Delta i =$ change in nominal interest rate.

The results of the equation (1.7) support the AIH for Pakistan. The high and significant values of marginal propensity to consume (MPC) ensure the invalidity of PIH and indicate that the predictable changes in income revise consumption decision of consumers in Pakistan.

Table 3 Estimated Results of Equation (1.6) and (1.7)

<table>
<thead>
<tr>
<th>Estimators of equations</th>
<th>$\Delta C_i = \alpha + \lambda \Delta Y_i + \varepsilon_i$</th>
<th>$\Delta C_i = \mu + \lambda \Delta Y_i + \sigma r_i + \varepsilon_i$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Models</td>
<td>Instr: List</td>
<td>$\alpha$</td>
</tr>
<tr>
<td>Model: 1 (OLS)</td>
<td>---</td>
<td>1555.95</td>
</tr>
<tr>
<td>Model: 2 (IV)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Model: 3 (IV)</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Model: 4 (IV)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Model: 5 (IV)</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Model: 6 (IV)</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

Note: Model one is estimated with the help of OLS method and model two, three, four, five and six are estimated through 2SLS method, by using the instrumental lists one, two, three, four and five respectively. The coefficient on (**, ***)) are statistically significant at the level of (5, 1) percent respectively.

The study also estimates equation (1.8) to highlight the reasons for the rejection of the neoclassical consumption hypothesis i.e. myopia and liquidity constraints. Myopia violates the PIH and implies that consumers consume a constant fraction of their current income. While in liquidity constrained consumers can smooth rising income through saving but are unable to smooth falling income. The equation (1.8) clarifies the source of the rejection of PIH. The estimates of the equation (1.8) are reported in table 4.

Equation (1.8) is estimated with the help of OLS and 2SLS by using the different instrumental variables, mentioned in table 2. There are three hypotheses regarding the equation (1.8). First, if the permanent income hypothesis is valid then: $\lambda_1 = \lambda_2 = 0$,
second, if the PIH is not valid due to myopia then the significant value of $\lambda_1$ and $\lambda_2$ will be: $\lambda_1 > 0, \lambda_2 > 0$ and $\lambda_1 = \lambda_2$, and third, if the PIH is not valid due to liquidity constraints then the significant value of $\lambda_1$ and $\lambda_2$ will be: $\lambda_1 > 0$, and $\lambda_1 > \lambda_2$.

Table 4 Estimated Results of Equation (1.8)

<table>
<thead>
<tr>
<th>Models</th>
<th>Instrument List</th>
<th>$\mu$</th>
<th>$\lambda_1$</th>
<th>$\lambda_2$</th>
<th>$\sigma$</th>
<th>$R^2$</th>
<th>F statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model: 1 (OLS)</td>
<td>———</td>
<td>-6.30E-10</td>
<td>-0.00269**</td>
<td>1.13</td>
<td>-1.52E-5</td>
<td>0.95</td>
<td>———</td>
</tr>
<tr>
<td>Model: 2 (IV)</td>
<td>1</td>
<td>3.40E-09</td>
<td>0.00165***</td>
<td>0.78</td>
<td>-2.52E-7</td>
<td>0.85</td>
<td>20.10***</td>
</tr>
<tr>
<td>Model: 3 (IV)</td>
<td>2</td>
<td>-1.2E-08</td>
<td>4.92E-6</td>
<td>1.10</td>
<td>4.92E-6</td>
<td>0.90</td>
<td>34.05***</td>
</tr>
<tr>
<td>Model: 4 (IV)</td>
<td>3</td>
<td>-3.40E-10</td>
<td>1.36E-08</td>
<td>0.85</td>
<td>-1.46E-4</td>
<td>0.95</td>
<td>15.23***</td>
</tr>
<tr>
<td>Model: 5 (IV)</td>
<td>4</td>
<td>-3.40E-09</td>
<td>1.95E-3***</td>
<td>1.20</td>
<td>1.95E-4</td>
<td>0.92</td>
<td>22.01***</td>
</tr>
<tr>
<td>Model: 6 (IV)</td>
<td>5</td>
<td>6.12E-09</td>
<td>4.45E-3***</td>
<td>0.98</td>
<td>-5.64E-5</td>
<td>0.92</td>
<td>26.12***</td>
</tr>
</tbody>
</table>

Note: Model one is estimated with the help of OLS method and model two, three, four, five and six are estimated through 2SLS method, by using the instrumental lists one, two three, four and five respectively. The coefficient on (**, ***) are statistically significant at the level of (5, 1) percent respectively.

Thus, the empirical results of table 3 shows that the value of $\lambda_1$ is negative in model 1 and positive and significant in all IV models. While the value of $\lambda_2$ is found insignificant in OLS and all remaining models.

These results of equation (1.8) support the results of equation (1.6) and (1.7) and reject validity of PIH because the possible condition for the validity of PIH is not found i.e. the expected negative and positive income do not affect consumption ($\lambda_1 = \lambda_2 = 0$). The condition which ensures myopia is also not observed in all models from 1 to 6. Because the value of $\lambda_2$ is insignificant in OLS model and throughout the IV models. Furthermore, the results somehow fulfill the condition of the liquidity constraints i.e. $\lambda_1$ is positive, significant and greater than zero. Furthermore, the results of equation (1.8) indicate that consumption is more sensitive to increases than decreases in predictable income, due to the significant values of $\lambda_1$ and the insignificant values of $\lambda_2$. As a result of this evidence the presence of liquidity constraints is ensured rather than myopia or perverse asymmetry. Therefore, we can say that the rejection of PIH in Pakistan is not subject to myopia but liquidity constraints.

IV. Conclusion

The study investigates validity of the PIH in Pakistan. The results indicate invalidity of PIH in Pakistan because the predictable changes in income can affect consumption. This is the clear violation of the neoclassical consumption hypothesis. Furthermore, to find out the reasons of the rejection of the PIH, the study applies Shea (1995) model to investigate the reasons of rejection of the PIH i.e. Myopia and liquidity
constraint. The results are supported by the presence of liquidity constraints rather than myopia and perverse asymmetry.

Hall’s model rejected the PIH for Pakistan, while the Campbell and Mankiw (1990) consumption model shows that small fraction of individuals support PIH in Pakistan. So, the asymmetry responses in consumption to the expected income suggest that the reason for the rejection of PIH in Pakistan is the liquidity constraint.

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