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

Khalid Khan (Lecturer Department of Economics, Lasbela University of Agriculture, Water and Marine Sciences, (LUAWMS), Uthal, Balochistan)

Hazrat Yousaf (Lecturer Department of Economics, Lasbela University of Agriculture, Water and Marine Sciences, (LUAWMS), Uthal, Balochistan)

Muhammed Ghazanfar Abbas (Lecturer Department of Economics, Lasbela University of Agriculture, Water and Marine Sciences, (LUAWMS), Uthal, Balochistan)

Manzoor H Memon ChE (Chartered Economist, Senior Manager, JCR-VIS Credit Rating Co. Limited)

Mohammed Nishat (Professor Department of Finance and Economics, Institute of Business Administration (IBA), Karachi)

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Abstract

This paper is an attempt to test the Permanent Income Hypothesis (PIH), Myopia and Liquidity Constraints as a case study for Pakistan. The paper also attempts to find out valid reasoning in case the PIH is rejected. Hall’s random walk model (1978) and Campbell and Mankiw model (1990) are used to test for the validity of PIH. The results reject the PIH and indicate the strong validity of Absolute Income Hypothesis (AIH) in Pakistan. Accordingly, Shea (1995) model is also used to validate the rejection of the PIH. The application of Shea (1995) model confirms the rejection; the symmetric relationship between consumption and expected income and provide a little evidence of existence of liquidity constraints.

Key Words: Permanent Income Hypothesis; Absolute Income Hypothesis; Symmetric Relationship; Liquidity Constraints

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. Whereas according to PIH, consumption of individual which is explained by its permanent income rather than its relative and current income, while LCH forwards the same argument in a different perspective. 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. However, empirically 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); and Campbell and Mankiw (1990). However, the results did not support the Hall’s Random walk hypothesis and argued that individual’s consumption is sensitive to current income rather than permanent income. This phenomenon has been named as “excess sensitivity of consumption” by Flavin (1981).

Before Campbell and Mankiw (1990), economist believes that an economy can satisfy one consumption hypothesis at a time. Campbell and Mankiw in their study proved that in economy consumers can satisfy both AIH and PIH, simultaneously. They divided consumers in two different segments i.e. ‘λ’ and (1- λ), where 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. The study reveals the irrelevance of PIH in the context of Pakistan, however there was no discussion drawn for the failure.

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. In myopia, consumption follows current income, as 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 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. Additionally, this study is also validates the rejection 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.
Methodology and Data Description

As far as literature is concerned, there are several consumption theories, and are already discussed in detail namely, AIH, PIH, LCH and RWH.

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

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

where \( E_t \) = expectation at period \( t \)  
\( C_t \) = private consumption at period \( t \)  
\( u \) = utility function  
\( \delta \) = 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:

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

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.:

\[ C_{t+1} = C_t + \varepsilon_t \]  

or

\[ E_t C_{t+1} = C_t \]  

Therefore,

\[ \Delta C_t = \varepsilon_t \]  

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.

Econometric Model

To test the PIH, the study uses following model:

\[ \Delta C_t = \alpha + \lambda \Delta Y_t + \varepsilon_t \]  

Where \( \Delta C_t \) consumption growth, \( \Delta Y_t \) is expected income growth. When \( \lambda = 0 \), PIH will be considered satisfied

The Campbell and Mankiw (1990) allow the interest rate in equation (1.6) for intertemporal substitution of forward looking consumer. Adding this, the augmented model becomes:

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

Where \( r_t \) is real expected interest rate

The PIH postulates that predictable changes in income have no affect on consumption while consumption can only be affected through interest rate. Therefore, if \( \lambda = 0 \) validates PIH. Under myopia, consumer consumes a fixed share of his 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 of liquidity constraints as individuals cannot borrow but save freely. In order to test the presence of liquidity constraints and myopia, Shea (1995) model is followed and following regression is used:

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

Where POS and NEG are dummy variables for periods, \( \Delta Y_t > 0 \) 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 liquidity constraint implies that: \( \lambda_1 \) is positive, significant and greater than \( \lambda_2 \).
Data and Variables

The analysis and test is based on the annual data of real disposable income, real consumption, real interest rate and consumer price index (CPI) for the period 1971 to 2010. The data was taken from International Financial Statistics (IFS) CD-ROM. The data consists of.

The detail and definition of variables are as under:

Real Private Consumption
Private consumption (in nominal form) 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. The real private consumption was calculated by deflating nominal private consumption with consumption deflator.

Labor Income
Labor income is one of the major sources of current income. While GDP is highly correlated with labor income, it is used as a proxy for labor income; real value was obtained by deflating the nominal value with consumption deflator. Whilst labour is positively related to the private consumption, 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 this, all nominal variables converted to their real counterparts.

Empirical Results
Firstly, the study tests the PIH for Pakistan, by estimating the equations (1.6) and (1.7). Table 2 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 strong validity of AIH for Pakistan. This reveals that consumption in Pakistan follows current income rather than permanent income. Both OLS and IV methods are used to estimate equation (1.7). Model 1, 2, 3, 4, and 5 are estimated by using the IV lists; first, second, third, fourth and fifth, IV lists offers by table 1.

The result of the equation (1.7) supports 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. 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 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 3.

Equation (1.8) is estimated with the help of OLS and 2SLS by using the different instrumental variables, mentioned in table 1. 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 \( \lambda_4 = \lambda_2 \), and third, if the PIH is not valid due to liquidity constraints then the significant value of \( \lambda_4 \) and \( \lambda_2 \) will be: \( \lambda_4 > 0, \text{ and } \lambda_1 > \lambda_2 \).

Thus, the empirical results of table 2 shows that the value of \( \lambda_4 \) is negative in model 1 and positive and significant in all four (IV) models. While the value of \( \lambda_2 \) is found insignificant in OLS and all remaining models.

Result of equation (1.8) supports 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 \( (\lambda_1 = \lambda_2 = 0) \). While the value of \( \lambda_2 \) is insignificant in OLS model and throughout the IV models, the condition which ensures myopia is also not observed in all models from 1 to 6. Nevertheless, 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.

**Conclusion**

The study investigates validity of the PIH in Pakistan. The results indicate invalidity of PIH in Pakistan because the predictable change in income affects 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.
Permanent Income Hypothesis.....

Table 1: 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} ; \Delta c_{t-2} \ldots , \Delta c_{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} ; \Delta y_{t-2} \ldots , \Delta y_{t-6} ; \Delta c_{t-2} \ldots , \Delta c_{t-6} ; c_{y_{t-2}} ; 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} ; c_{y_{t-2}} ; 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, \(\Delta c\) = growth rate of real household consumption, \(c_{y}\) = log of MPC, and \(\Delta i\) = change in nominal interest rate.

Table 2: 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)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Models</td>
<td>(\alpha)</td>
<td>(\lambda)</td>
</tr>
<tr>
<td>Model: 1 (OLS)</td>
<td>(\alpha)</td>
<td>(\lambda)</td>
</tr>
<tr>
<td>Model: 2 (IV)</td>
<td>5</td>
<td>0.7401**</td>
</tr>
<tr>
<td>Model: 3 (IV)</td>
<td>2</td>
<td>0.888***</td>
</tr>
<tr>
<td>Model: 4 (IV)</td>
<td>3</td>
<td>0.748***</td>
</tr>
<tr>
<td>Model: 5 (IV)</td>
<td>4</td>
<td>0.777***</td>
</tr>
<tr>
<td>Model: 6 (IV)</td>
<td>5</td>
<td>0.793***</td>
</tr>
<tr>
<td>Model: 6 (IV)</td>
<td>6</td>
<td>0.785***</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.
Table: 3 Estimated Results of Equation (1.8)

<table>
<thead>
<tr>
<th>Estimators of equations</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>
<th>DW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Models: 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>0</td>
<td>1.52</td>
</tr>
<tr>
<td>Models: 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>
<td>1.47</td>
</tr>
<tr>
<td>Models: 3 (IV)</td>
<td>2</td>
<td>-1.2E-08</td>
<td>0.00321**</td>
<td>1.10</td>
<td>4.92E-6</td>
<td>0.90</td>
<td>34.05***</td>
<td>1.47</td>
</tr>
<tr>
<td>Models: 4 (IV)</td>
<td>3</td>
<td>1.36E-08</td>
<td>4.92E-3**</td>
<td>0.85</td>
<td>-1.46E-4</td>
<td>0.95</td>
<td>15.23***</td>
<td>1.51</td>
</tr>
<tr>
<td>Models: 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>0.82</td>
<td>22.01***</td>
<td>1.47</td>
</tr>
<tr>
<td>Models: 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>
<td>1.76</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.

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