

PERMANENT-INCOME HYPOTHESIS: A MICRO LEVEL ANALYSIS OF PAKISTAN

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Abstract

The present study is an empirical investigation of household consumption function under the permanent-income hypothesis for Pakistan based on Pakistan household-integrated-economic-survey (HIES) 2015-16 which was especially designed under the household-integrated-income and consumption survey HICS). The present study examined two main assertions of the permanent-income theory i.e. the strict version and loose version. The strict version defines that the marginal-propensity to consume out of permanent-income is 1 and 0 for transitory-income, while the loose version states that the marginal propensity of consumption is greater for permanent-income than the transitory income. In order to investigate these assertions the study followed the methodology of Mayer (1966) and Vakil (1973). The results of the study altogether reject the strict version of the Friedman theory; however, the data support the loose version of permanent-income hypothesis for Pakistan.

Keywords: Household Consumption, Permanent-Income Hypothesis, MPC, Pakistan.

JEL Classification: D120, E120, C220

Introduction

The household consumption and saving are two important macroeconomics indicators, which are deemed to be a vital part of macroeconomic policy and growth. Being such important variables they are very popular in empirical research, even from the early ages of macroeconomics in Keynesian era where Keynes (1936) defined the absolute-income hypothesis and since then different theories has been established, however among these theories one of the most remarkable theory is the permanent-income hypothesis developed by Friedman (1957). This hypothesis has been extensively through several studies based on aggregate macro level data or the household level micro-data these household level studies can be classified into two segments where in one type of studies based on household income and expenditures data over 2 to 5 years, at least, as discussed by Serlenga (2001),

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Attanasio and Tullio (2001), DeJuan and Seator (2007), and Ashok and Krishna(2011). While, if the repeated household consumption and income profile available only for a single year, then this method cannot be applied. In this case when the cross-sectional observations are available then household are divided into homogenous groups; based on their socio-economic characteristics such as age, income, education and occupation. However, the most of the studies divided the households on the basis of occupation as Eisner (1958), Mayer (1966), Ramanathan (1968, 1971), Vakil (1973) and Gerrard (1980). In order to find the unobservable permanent-income it is assumed that the mean transitory income approaches zero so the mean income of group can be taken as permanent-income of each group unit.

The present study examined two main assertions of the permanent-income theory i.e. the strict version and loose version. The strict version defines that the marginal-propensity to consume out of permanent-income is 1 and 0 for transitory-income, while the loose version states that the marginal propensity of consumption is greater for permanent-income than the transitory income. In order to investigate these assertions the study followed the methodology of Mayer(1966) and Vakil (1973). This study employed Pakistan household-integrated-economic-survey (HIES) 2015-16 specially designed under the household-integrated-income and consumption survey (HICS), while the households are divided into forty occupational groups.

The rest of the study is organized as follows: section II discusses the past literature, section III consist of Analytical Framework and modeling, section IV defines Empirical Specifications and Data Issues, section V based on explanation of the data sources and estimation technique, section VI constitute on the empirical results and finally the conclusion is discussed in section VII.

Literature Review

The micro-econometrical analysis of household data under the permanent-income hypothesis is very common, several studies exist in this regards. In a recent analysis of Irish household Kristen (2014) validated the permanent income hypothesis (PIH) by using Irish cross sectional household data sets of 1994-95, 1999-2000 and 2004-05. Each data set is further divided into three categories i.e. owner of the house, mortgage and tenants. The disposable income with some other variables including age, household size, education and job status were used as instrument for measuring the permanent income. The results show that majority of the households' consumption depends on their permanent income.

DeJuan and Seator (2007) conducted a rigorous empirical estimation of permanent income hypothesis using Consumer Expenditure Survey (CEX) data from 1980 to 1991. This special form of data is collected on quarterly basis where same household are interviewed during the year, however for next year new household are selected. This special feature of the data made it possible to generate permanent income through this cross section survey. The study followed the Friedman and divided the entire sample into several groups of identical households on the basis of education, occupation,

region, age, and consumption and housing expenditures. The study employed instrumental variable approach where the results support the permanent income hypothesis in all the cases, except a few.

Sabelhaus and Jeffrey (2000) examined the applicability of permanent income hypothesis on cross sectional data by using US consumer expenditure survey (CEX) data for 1992, which was compare with the data of US Panel Study of Income Dynamics (PSID) from 1982 to 1991. The study concluded that the cross sectional data unable to show the actual skewness in consumption-income ratios even after applying several assumptions. Similarly, Serlenga (2001) examined the permanent income hypothesis by using three approaches namely through the Euler equation approach, aggregate consumption approach and through the characteristics tests. The study employed British household balanced panel survey data from 1991 to 1999 containing 2978 household. The estimated results based on fixed effect and GMM technique shows that in all the cases the coefficient of income is insignificant in the growth model, indicating the acceptance of PIH.

Attanasio and Tullio (2001) examined the theory of inter-temporal choice where the cross-sectional variance of the marginal utility of consumption depends on its own lag plus constant and stochastic component, by using the pool data of The British Family Expenditure Survey from 1974 to 1993, U.S. Consumer Expenditure Survey from 1980 to 1995 and the Italian Survey of Household Income and Wealth from 1987 to 1995. Each data set is divided into 10 cohort groups based on the household head age, where cohort 1 consist of the people who were from 71 to 75 years old and cohort 10, the last cohort, was belong to the people who were from 26 to 30 years old.

Gerrard (1980) examined the validity of PIH for Canada by using family expenditure survey of Canada 1969. The study followed the approach of Eisner (1958), Mayer (1966) and Modigliani and Ando (1960) where the entire data set is divided in sub groups on the basis of different variables which are assumed to be correlated with permanent income, but not with the transitory income. The division of the groups based on income, occupation, age, provinces, region, family size and family life cycle. To estimate the permanent consumption, the study generated a series of mean consumption based on each group's mean consumption and the permanent income series is obtained through the mean income of each groups and then these series were estimated through OLS and two different hypothesis of permanent income i.e. the estimated elasticity coefficient is equal to 1 and the variance of transitory income is equal to zero, based on cross sectional data were tested through t-test. The estimated results show that in 5 out of 8 cases the variance of transitory income is equal to zero, strong evident of PIH, while the hypothesis related to income elasticity coefficient shows a mix result, where 4 out of 8 are equal to 1.

Musgrove (1979) estimated the Friedman's permanent (PIH) hypothesis using the household budget data for seven major cities of Colombia, Ecuador and Peru; during 1967 to 1969. The estimation based on OLS where disposable household income and non-durable consumption, separately were regress on different household factors to estimate the predicted values of both. The estimated results

show that education is the most powerful explanatory of the permanent income while the results also support the PIH in all the cases.

Ramanathan (1971) estimated the PIH through a minor modification in his previous work Ramanathan (1968), the study employed the same methodology, except the addition of, one more explanatory in saving regression, number of earners as an explanatory variable of saving with the wealth. The empirical analysis based on the Indian household survey during 1959. The estimated results show that the household classification on the basis of education is most suitable in estimation of permanent income. The comparative results of modified permanent income, which is called pseudo-permanent, and group mean income as a proxy of permanent income, show that pseudo-permanent income has high explanatory power in terms of R-square; indicating a better approximation of permanent income. The results of the study also found high explanatory power of the regression when wealth and number of wage earners were included.

Ashok and Krishna (2011) investigated the permanent income theory by using US Farm-Household data, conducted by Agricultural Resource Management Study (ARMS) in 2004. The study tests the Friedman tenet that people consume the entire permanent income while the saving entirely depends on the transitory income. The estimated results show that occupation, wage earners, age, rain fall, education and regional difference are the major predictor of permanent income. The results of wealth functions show that estimated income, the proxy of permanent income, is better predictor of wealth than the actual income.

Beznoska and Richard (2012) estimated the assumptions of Friedman permanent-income that the permanent income shocks have a unitary impact on consumption while the transitory shocks have nearly zero impact on consumption. The study employed the pseudo panel data of German household from 2002 to 2007, however the estimated results in general do not support the PIH theory however there is significant different in behavior of household, in terms of income shocks, who have liquidity constraint against those who do not have any liquidity constraint.

Vakil (1973) estimated two hypothesis of permanent i.e. the APC permanent income does not depend on permanent income and MPC of permanent income is greater than the MPC of measured income or in terms of elasticities the consumption elasticity of permanent income is larger than the consumption elasticity of measure income. To check these hypotheses, the strict version and loose version of PIH, the study employed four different data sets related to Indian households including Dehli Survey for 1959, Urban Income-Saving survey of 1960, the third survey was All-India Rural -Household Survey of 1962 and last one was the All India Consumer Survey of 1964. All the data sets were classified into different groups on the basis of age, home ownership, occupation and education and the mean income of the group is considered as the permanent income. The estimation followed two models one a linear form to estimate the MPCs based on income groups and occupational groups while the second log-log model is used to estimate the elasticities. To test the hypothesis related to

APC the significance of the coefficient of intercept of the occupational group is checked while to test the second hypothesis Mayer's (1966) Prediction coefficient is used which is the ratio of the difference of MPC occupational group to APC divided by the difference of MPC of income group to APC. The estimated coefficient value indicates that is the resultant is 0 then the PIH entirely correct, if it is 1 then entire reject and if it lies in between 0 to 1 then we cannot reject the second hypothesis a loose version PIH. The overwhelming majority accepts the loose version; accept the second hypothesis, of PIH while the strict version is rejected.

The review of the existing research stock highlights that in case of Pakistan this sort of researches are scanty, however there are few studies which investigated consumption hypotheses in case of Pakistan by using time series data as Ali et al. (1997) examined the determinant of saving under Life-cycle hypothesis in case of Pakistan. Khalid (1994) estimated the relevance of rationale expectation PIH for Pakistan. The study based on the Hall's (1978) and Flavin (1981) methodology where annual data of private consumption, disposable income as labor income, unemployment rate and money balance were used from 1960 to 1992. The estimated results of this model also rejected the rational income-PIH, as the coefficient of current unexpected and expected income was statistically significant.

Khan and Nishat (2011) estimated the PIH based on Hall (1978) random walk in case of Pakistan. The study followed the Shea (1995) methodology for which growth of consumption is regress on growth of income in the first model. The study employed aggregate data from 1971 to 2010 in real terms while the estimated was based on OLS and IV regression, where 6 different models were estimated by changing the lags variable, as an instrument. The estimated results of models rejected the PIH, so to find the plausible reason of myopia or liquidity constraints the study estimated a third model, with the help of OLS and 2SLS methodology. The results of third model also rejected myopia however it indicated that there was liquidity constraint problem.

Analytical Framework and Modeling

A Simple Theoretical Model

The present study examined two main assertions of the permanent-income theory i.e. the strict version and loose version. The strict version defines that the marginal-propensity to consume out of permanent-income is 1 and 0 for transitory-income, while the loose version states that the marginal propensity of consumption is greater for permanent-income than the transitory income. In order to investigate these assertions the study followed the methodology of Mayer (1966) and Vakil (1973). However, the crucial issue is the measurement of the unobservable permanent-income which is generated under the assumption that the mean transitory income approaches zero so the mean income of a group can be taken as permanent-income of each group unit.

Empirical Specifications and Data Issues

Following the assumptions, a simple consumption function is formulated where the permanent-income is measured through the mean income of each group.

$$C = \alpha_{1p} + \alpha_{2p}Y_p + \varepsilon \quad \text{-----} \quad (1)$$

and

$$C = \alpha_{1y} + \alpha_{2y}Y_y + \varepsilon \quad \text{-----} \quad (2)$$

Where,

C is the household mean consumption of each group

α_{1p} is the intercept of the equation, which is the autonomous-consumption, more importantly it defines the factors, other than the permanent-income, which also effect the consumption? Moreover, under the strict version of the theory this parameter should be zero.

While α_{2p} is the MPC out of permanent-income, Y_p is the permanent-income and Y_y is the observed income. This linear model is further transformed into log-log model to estimate the elasticities, as

$$\ln C = \beta_{1p} + \beta_{2p} \ln Y_p + \varepsilon \quad \text{-----} \quad (3)$$

and

$$\ln C = \beta_{1y} + \beta_{2y} \ln Y_y + \varepsilon \quad \text{-----} \quad (4)$$

Where ln is the natural logarithmic, while the remaining variables have the same definition.

The above equations 1 to 4 define four different models which are estimated in order to validate the permanent-income hypothesis for Pakistan. Once the parameters of the linear models are estimated, two different hypotheses are tested, one for strict version and other for loose version. The strict version assumed that $\alpha_{1p}=0$, which indicates that consumption only depends on permanent-income, a formal two-tail t-test is applied to validate this hypothesis.

The second hypothesis, based on loose version of the theory, is examined through the Mayer's (1966) prediction-coefficient. The Mayer's coefficient is examined the extend of loose version, which

is calculated as

$$m = \frac{MPC_p - APC}{MPC_y - APC} \text{-----}(5)$$

Where MPC_p is the MPC out of permanent-income, MPC_y is the MPC out of observed income of same occupational groups and APC is the average propensity to consume of all the households. The value of the coefficient 'm' varies on the basis of validity of the hypothesis as, if the permanent-income hypothesis verified then MPC_p is equal to APC and the Mayer's coefficient become 0. Another extreme version is that, if the hypothesis is entirely rejected then MPC_p and MPC_y become equal and the coefficient would be 1. However there is an intermediate range of this coefficient which lies from 0 to 1; the value of coefficient shows at what extend the permanent-income hypothesis is valid.

These two assertions of permanent-income will also be tested on the estimated coefficients of log-log models or on elasticities. In this case the strict version says that $\beta_{lp}=0$ in order to test this hypothesis a formal two-tail t-test is applied to validate the strict version of the permanent-income theory. The second hypothesis i.e. the loose version of the theory is examined by taking the ratio of permanent-income elasticity with observed income elasticity i.e. β_{2p}/β_{2y} if this ratio is greater than the unity; implies that we cannot reject the loose version of the theory.

Data Sources and Estimation Techniques

Present study based on the cross-sectional data of Pakistan household-integrated-economic-survey (HIES) 2015-16 which was especially design under the household-integrated-income and consumption survey (HICS). This data-set covers 24,238 household selected from entire country, however after necessary adjustment and cleaning by excluding unemployed, zero current income, farmers and business people, the estimation performed on 11904 households. Finally, an ordinary-least square is applied to estimate the MPCs and elasticities.

Empirical Results and Discussion

The estimated results are mentioned in table-1 which shows that in all four models both the permanent-income and observed income is highly significant and positive. The overall significance F-test and R-square is mentioned in the appendix-A table-1 which shows rather high R-square with significant f-statistics. The other diagnostic test results are also mentioned in appendix-Atable-1 &2 the results of white test for heteroscedasticity shows that there is no heteroscedasticity in all the models, similarly for functional form Ramsay RESET-test is applied which results show that the functional form correct for all the models.

Table 1
Estimated Marginal Propensities and Elasticities

Estimated Models	Variable	Coefficient	Std. Error	t-Statistic[Prob]
Model 1	Permanent-Income (α_{2p})	0.730	0.015	48.170[0.000]
	(α_{1p})	77944.060	5987.579	13.017[0.000]
Model 2	Observed Income (α_{2y})	0.346	0.135	2.567[0.0143]
	(α_{1y})	255527.400	57159.660	4.470[0.0001]
Model 3	Log Permanent-Income (β_{2p})	0.804	0.019	41.663[0.000]
	(β_{1p})	2.473	0.248	9.988[0.000]
Model 4	Log Observed Income (β_{2y})	0.313	0.071	4.439[0.0001]
	(β_{1p})	8.845	0.888	9.955[0.000]

The results of the strict version hypothesis are mentioned in table 2, which shows that the strict version of permanent-income hypothesis is rejected in both of the functional forms. The results show that α_{2p} and β_{2p} are not equal to unity while the results of α_{1p} and β_{1p} are equal to zero also rejected. Hence the overwhelming majority of the results rejected the strict version of permanent income hypothesis in case of Pakistan.

Table 2
Results of Hypothesis Testing of Strict Version

Estimated Model	Variable	Coefficient	Null Hypothesis	Test Statistic (t-statistic values)	Decision
Model 1	Permanent-Income (α_{2p})	0.730	$\alpha_{2p}=1$	-18.13	Rejected
	(α_{1p})	77944.060	$\alpha_{1p}=0$	10.93	Rejected
Model 3	Log Permanent-Income (β_{2p})	0.804	$\beta_{2p}=1$	-10.19	Rejected
	(β_{1p})	2.473	$\beta_{1p}=0$	9.99	Rejected

Table 3 and table 4 are based on the loose version of the hypothesis where in table 3, Mayer's coefficient is estimated by using the equation (5). The estimated coefficient supports the loose version of the permanent-income hypothesis for Pakistan.

Table 3
Estimation of Mayer's Coefficient

MPC out of permanent-income (MPCp)	MPC out of observed income (MPCy)	APC	Mayer's Coefficient (m)
0.730	0.346	0.896	0.3

The results of log-log model are also used to verify the loose version, which are mentioned in table 4. The ratio of the permanent and observed income elasticities also endorses the validity of loose version.

Table 4
Estimation of Loose version of Permanent-income Hypothesis: Elasticities Ratio

Elasticity out of permanent-income (MPCp)	Elasticity out of observed income (MPCy)	Elasticity Ratio β_{2p}/β_{2y}
0.804	0.313	2.57

Conclusion

This part of the study examined the relevance of permanent-income hypothesis in Pakistan by using the household micro level data. The present study examined two main assertions of the permanent-income theory i.e. the strict version and loose version. The strict version defines that the marginal-propensity to consume out of permanent-income is 1 and 0 for transitory-income, while the loose version states that the marginal propensity of consumption is greater for permanent-income than the transitory income. In order to investigate these assertions the study followed the methodology of Mayer (1966) and Vakil (1973). The study based on the cross-sectional data of Pakistan household-integrated-economic-survey (HIES) 2015-16 which was especially design under the household-integrated-income and consumption survey (HICS).

The results of the study altogether reject the strict version of the Friedman theory; however, the data support the loose version of permanent-income hypothesis. These results are similar to the other studies as Vakil (1973) found the same results for India. The estimated results reinforce that at household level any change in permanent income has significantly larger effect on consumption than the observed income. Hence for any policy making the larger MPC out of permanent-income suggests that the policy makers need to increase the permanent income of households, instead of temporary income, in order to increase their standard of living and consumption.

References

- Ali, N., Ahmad, E., & BUTT, A. R. (1997). Dependency Burdens And Savings Rates In Pakistan—A New Strategic Study. *Pakistan Economic and Social Review*, 35(2), 95-130.
- Ando, A., & Modigliani, F. (1960). The 'permanent income' and the 'life cycle' hypothesis of saving behavior: comparisons and tests. *Consumption and saving*, 2, 74-108.
- Attanasio, O. P., & Jappelli, T. (2001). Intertemporal choice and the cross-sectional variance of marginal utility. *Review of Economics and Statistics*, 83(1), 13-27.
- Beznoska, M., & Ochmann, R. R. (2012). Liquidity constraints and the permanent income hypothesis: pseudo panel estimation with German consumption survey data.
- DeJuan, J. P., & Seater, J. J. (2007). Testing the cross-section implications of Friedman's permanent income hypothesis. *Journal of Monetary Economics*, 54(3), 820-849.
- Eisner, R. (1967). A permanent income theory for investment: some empirical explorations. *The American Economic Review*, 57(3), 363-390.
- Flavin, M. A. (1981). The adjustment of consumption to changing expectations about future income. *Journal of political economy*, 89(5), 974-1009.
- Friedman, M. (1957). Introduction to "A Theory of the Consumption Function". In *A theory of the consumption function* (pp. 1-6). Princeton university press.
- Gerlach-Kristen, P. (2014). Testing the permanent income hypothesis for Irish households, 1994 to 2005. *The Economic and Social Review*, 45(4), 511-535.
- Gerrard, C. D. (1980). A re-examination of the permanent income hypothesis using cross-section Canadian data. *The Canadian Journal of Economics/Revue canadienne d'Economique*, 13(1), 142-151.
- Hall, R. E. (1978). Stochastic implications of the life cycle-permanent income hypothesis: theory and evidence. *Journal of political economy*, 86(6), 971-987.
- Keynes, J. M. (1936). *The general theory of employment, interest, and money*. New York: Harvest.
- Khalid, A. M. (1994). Empirical Tests of the Rational Expectations—Permanent Income Hypothesis: Evidence from Pakistan. *The Pakistan Development Review*, 33(4), 1043-1053.
- Khan, K., & Nishat, M. (2011). Permanent income hypothesis, myopia and liquidity constraints: a case study of Pakistan. *Pakistan Journal of Social Sciences (PJSS)*, 31(2), 299-307.
- Mayer, T. (1966). The propensity to consume permanent income. *The American Economic Review*, 56(5), 1158-1177.
- Mishra, A. K., & Paudel, K. P. (2011). Estimating permanent income and wealth of the US farm households. *Applied Economics*, 43(12), 1521-1533.
- Musgrove, P. (1979). Permanent household income and consumption in urban South America. *The American Economic Review*, 69(3), 355-368.
- Ramanathan, R. (1968). Estimating the permanent income of a household: An application to Indian data. *The Review of Economics and Statistics*, 383-388.
- Ramanathan, R. (1971). Measuring the permanent income of a household: an experiment in methodology. *Journal of Political Economy*, 79(1), 177-185.

- Sabelhaus, J., & Groen, J. A. (2000). Can permanent-income theory explain cross-sectional consumption patterns?. *Review of Economics and Statistics*, 82(3), 431-438.
- Serlenga, L. (2001). Three alternative approaches to test the permanent income hypothesis in dynamic panels. *University of Edinburgh*.
- Shea, J. (1995). Myopia, liquidity constraints, and aggregate consumption: a simple test. *Journal of money, credit and banking*, 27(3), 798-805.
- Vakil, F. (1973). The Propensity to Consume Permanent Income in India. *Economic Development and Cultural Change*, 21(3), 514-521.

Appendix

Table1

Diagnostic Test of Each Model

Test	Model 1	Model 2	Model 3	Model 4
R-squared	0.984	0.354	0.979	0.342
F-statistic	2398.766	20.840	1735.815	19.710
Prob(F-statistic)	0.000	0.000	0.000	0.000
Functional Form- Ramsey RESET Test	0.280	0.296	0.351	0.217

Table2

White Heteroskedasticity Test

Models	Prob. F
Model 1	0.163
Model 2	0.147
Model 3	0.3225
Model 4	0.9038