A Note on The Two Concepts of Permanent Income

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I. Introduction

Friedman defines the permanent income of a consumer unit as the product of an interest rate r and the stock of wealth W; the stock of wealth is interpreted as the present value of anticipated future receipts from both human and non-human assets. Permanent income is thus a theoretical construct. However, one can find its empirical counterpart once the wealth data is available.1

When Friedman published his pathbreaking *A Theory of the Consumption Function*, the data on wealth for the United States either were not available or were not sufficiently refined to be used as a basis for economic policy analysis. It would appear that this led Friedman and those who followed him to estimate permanent income as the weighted average of the present and past values of measured income on the basis of aggregate data. The weighted average method of calculating permanent income has considerable backing that is rooted in consumer psychology,2 yet it has been subjected to substantial criticism.3


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2We wish to thank Irshad Amin for his assistance in compilation. We are also thankful to a referee of this journal for some helpful comments on an earlier draft of this paper.
6"R. J. Bond, "Some Implications of the Permanent Income Hypothesis," *The Review of Economic Studies* (1957). Bowden also points to the weak attempt made by Friedman to relate the two concepts of income.
exponentially through time. Both the weights and the number of years are allowed to be determined by the data; the weights by multiple correlation and the number of years by adding years successively until an additional year produces no significant increase in correlation. The second approach to estimating permanent income is to derive it directly from wealth data. One of us has computed permanent income on this basis in another paper. The following relation was postulated: \[ Y_p = r \cdot W \] (1) where \( Y_p \) is permanent income, \( r \) is the subjective interest rate, and \( W \) is the sum of human and non-human wealth. However, in equation (1) only \( W \) is observable: \( Y_p \) and \( r \) cannot be observed. Following Friedman, we can rewrite equation (1) as \[ Y_p = Y - r \cdot W \] (2)

A discrete analogue of the following equation was fitted:

\[ Y_d(T) = \beta \cdot \sum_{n=0}^{T-1} w^n Y(T-n) \]

where \( Y_d(T) \) is permanent income, \( Y(T) \) is measured income, \( T \) is the date for which estimates are constructed, and \( w \) covers the whole range of earlier dates, \( 0 < w < 1 \) is the rate of interest, \( 1/w \) is the consumer's horizon. The fitted value of \( w \) is not. Without the trend factor, the above equation when applied to a steadily growing series yields estimated values of permanent income systematically below their measured values. In other words, it does not take into account any past rate of increase in wealth. In order to remove this defect we adjusted the permanent income series by a trend factor. Following Friedman, the value of \( w \) was taken to be 0.3 for the income series. We used the value of \( \beta = A \cdot b \) based on our past research. C. F. Rees and A. Malhahit, "The Permanent Income Hypothesis: Evidence from Time-Series Data," The American Economic Review (September 1975). We set \( b = 4 \), a number between 2 and 6, and the first estimate. In computing permanent income, the weights used were 0.33, 0.27, 0.20, 0.12, 0.07, 0.05, 0.04, 0.03, 0.02, 0.01, 0.00, 0.00. A summary of these work is given in Table 1.


or

\[ y_p = r \cdot W + y_1 \]

with

\[ y_1 = 0 \]

where \( y_p \) is measured income whose magnitude is observable, \( y_1 \) is transitory income and is not observable, and \( y_1 \) is the average value of transitory income which is assumed to be zero. Equation (2) can be used to estimate the values of \( r \). To obtain a time path of \( r \) we use the varying parameter regression approach of estimation that has recently been advanced by Cooley and Prescott. The underpinnings of this approach are rooted in the notion that the regression parameters in an econometric model may be subject to sequential variation over time. This may be due to a host of reasons such as misspecification of the model, structural changes and problems of aggregation. This approach has the advantage of making it possible to separate parametric variations that are transitory from those that are permanent.

The relevance of the time varying parameter method of estimation can be easily seen in this study. The economic conditions in the U.S. have varied over the sample period and it would be appropriate to expect \( r \) to vary over these years. \( r \) is, after all, a weighted average index of observable and non-observable interest rates. The observable rates have fluctuated widely with variations in the levels of economic activity, and there may be little reason to assume that the non-observable rates, that are mainly dependent on household decisions, have remained unchanged. Once the permanent values of \( r \) have been computed, the required values of \( Y_p \) are obtained as the product of the yearly estimates of \( r \) and their contemporaneous \( W \).

Friedman himself has not offered any specific method of computation for estimating permanent consumption. \( C_p \). He only suggests that \( C_p \) is highly correlated with \( Y_p \). Following this suggestion we estimated \( C_p \) from the following equation:

\[ C_p = a_0 + a_1 Y_p \]

where \( C_p \) is measured consumption.

Equation 3 is used to estimate two sets of time series values of permanent consumption. The first set is obtained when we use the values of \( Y_p \) that are calculated from the weighted average method; the second set is derived when we substitute the values of \( Y_p \) that are estimated from wealth data. By using the varying parameters method of estimation we are able to derive yearly values of marginal propensity to consume, \( a_1 \), for each consumption series. The advantages of this method lie in the fact that it also enables us to estimate any annual shift in the intercept term, \( a_0 \), and separate its transitory movement from the permanent one. Upon estimating the time series values of \( a_1 \) and \( a_0 \) for each method, i.e., the weighted average method and the wealth method, the corresponding time series values of \( C_p \) are found by multiplying the annual marginal propensity to consume into the respective permanent income series and adding the associated annual values of the intercept. Transitory concepts of income and consumption were found by deducting their permanent components from their respective measured values.

This method of computing permanent consumption, although not using the varying parameter method of estimation, as used in previous studies, does not violate the comparative advantage of the two methods in the present study. In deriving the consumption functions from the two methods, we have used two sets of estimated based on consumption with and without durability goods. We have set that the marginal propensity to consume permanent income lies somewhere in between the two estimates. Our consumption data are strictly in accord with the PIH and consists of the consumption of non-durable goods and the services of the durables.
TABLE I Marginal Propensity to Consume Permanent and Transitory Incomes in the United States 1945-69 (t values are in parentheses)

<table>
<thead>
<tr>
<th>Method</th>
<th>Model</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Declining Wage Method</td>
<td>C₀ + C₁Yₙ₋₁ - 0.0427Y₀ + 0.0122Yₙ₋₂ + 0.429 (1.75)</td>
<td>.916</td>
</tr>
<tr>
<td>Wealth Data Method</td>
<td>C₀ + C₁Yₙ₋₁ + 0.8527Y₀ + 0.0252 (0.32)</td>
<td>.977</td>
</tr>
</tbody>
</table>

Notes: The concept of measured income employed in this study is more comprehensive and consistent than disposable income, personal savings, the excess of wage accruals over wage disbursements, net government transfer payments and statistical discrepancy. This concept of measured income was initially proposed by Friedman in the context of a study on the relative stability of monetary velocity and investment multiplier and was subsequently defended by Friedman and Muth in "The Use of Money," "The Theory of Consumer Behavior" (New York: National Bureau of Economic Research, General Series No. 100; 1951; p. 203 and p. 204).

Data Sources: Data on wealth obtained from John W. Kendrick, The Formation and Flow of Total Capital (The National Bureau of Economic Research, General Series No. 100; 1951; p. 203 and p. 204).


The declining weight method yields marginal propensity to consume transitory income of -0.247, which is significant at the 5 per cent level. The spuriousness of this result can be accounted for by the computational procedure employed in calculating transitory consumption compared with transitory income. Several writers have pointed out that when using the declining weight method, transitory income would rise systematically if measured income is rising. But the derivation of transitory consumption appears to be more in line with Friedman's theoretical formulation of the PIH, and yields values of transitory consumption which are both positive and negative over time and of relatively small magnitude. On the other hand, the marginal propensity to consume transitory income under the wealth method is statistically insignificant at the 5 per cent level.

As a final step the validity of the fundamental assumptions of the PIH regarding the no correlation thesis between the permanent and transitory elements and the transitory elements themselves was verified. The results are presented in Table II.

The declining weight method of computing permanent income does not support the assumptions of zero correlation between Y₀ and Y₀, between C₀ and Y₀, and C₀ and C₀ at the 5 per cent significance level. On the other hand, when Yₙ is directly derived from wealth data, Friedman's zero correlation contention is strongly upheld. The corresponding values of R² under the direct wealth method are extremely small in all cases, and none of them is significantly different from zero.

IV. Concluding Remarks

It has been the purpose of this study to show that controversy about the empirical findings growing out of the PIH have been more due to the methodology of estimating permanent income than to the conceptual framework of the hypothesis. To this end we computed two series of permanent incomes for the U.S. 1945-69; one directly from the total private wealth and the other from the declining weight method. The consumption series prepared for this study in strict accord with the PIH requirements. The strict version of the PIH which describes a state of proportionality between C₀ and Y₀ and no relation between C₀ and Y₀ was tested using both methods of estimating permanent income. Juxtaposing these results, we find that the declining weight methodology, which has been frequently used, does not unequivocally support the PIH. The wealth data approach, on the other hand, strongly supports the basic tenets of the PIH and rejects the a priori view held by Bowden that there exists a negative correlation between Y₀ and Y₀. Our results, based on the direct wealth method of estimation, show a zero correlation between Y₀ and Y₀ as they do between the other pairs of permanent and transitory elements and the transitory elements themselves.

The disparity between the estimates of the corresponding components of the PIH as derived by the two different methods leads us to view with caution some of the policy implications proposed by a number of well-known studies, including some of Friedman's, which are based on the weighted average method. Such circumspection is warranted as the estimates of Y₀ based on the weighting pattern are systematically below those which are computed from the wealth data resulting in an MPC from the former to be 12% larger than from the latter.

TABLE II Coefficients of Determination, R², Between Permanent and Transitory Elements and Between Transitory Elements, U.S., 1945-69

<table>
<thead>
<tr>
<th>Method of Measuring Y₀</th>
<th>R²(Y₀, Y₀)</th>
<th>R²(Y₀, C₀)</th>
<th>R²(C₀, Y₀)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Declining Weight Method</td>
<td>0.710</td>
<td>0.477</td>
<td>0.429</td>
</tr>
<tr>
<td>Wealth Data Method</td>
<td>0.020*</td>
<td>0.070*</td>
<td>0.030*</td>
</tr>
</tbody>
</table>

Note: *R² values marked with asterisks are not significant at the 5 percent level.