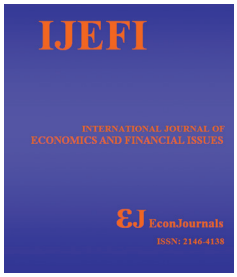

International Journal of Economics and Financial Issues

ISSN: 2146-4138

available at http: www.econjournals.com

International Journal of Economics and Financial Issues, 2016, 6(4), 1371-1378.

Testing the Permanent Income and Random Walk Hypotheses for Turkey†

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ABSTRACT

There have been ongoing researches and debates on the dynamics of developing economies with structural changes within literature of economics since 1770s. Economics investigated some basic themes during mercantilism and physiocracy period and, however, shaped its scientific approaches together with related techniques of philosophy/mathematics/statistics through the models of Classical, Keynesian, Neo-classical, Neo-Keynesian and Monetarist. Among these approaches, permanent income hypothesis (PIH) and random walk hypothesis (RWH) have been searching/analyzing the alternative consumption functions with related possible significant parameters since 1930s. This paper, first observes different income-consumption relations through decomposing them by using auto-regressive (AR) process to test the validity of PIH, later, considers testing the RWH by decomposing permanent income into expected and unexpected parts throughout AR processes. Thereby, paper intends to explore, if exists, excessive smoothness and/or excessive sensitivity of consumption in Turkey by employing Turkish quarterly data for consumption and income, spanning from 1998:1 to 2012:1. Outcome of this paper indicates that consumption is found sensitive to changes in unexpected income as well as changes in expected income. Findings reveal overall that absolute income hypothesis is confirmed in Turkish economy.

Keywords: Consumption, Income Hypothesis, Auto-regressive Process, Excessive Sensitivity
JEL Classifications: C22, D12, E21

†This paper is derived mainly from MA dissertation by H. Hilal Bağlıtaş, under supervision of Faik Bilgili, entitled 'Testing the Models of Absolute Income Hypothesis, Permanent Income and Random Walk through Time Series Data for Turkey' (in Turkish), Erciyes University, Social Sciences Institution, August 2013, funded by ERU-BAP (BAP Project No: SYL-2013-4423, ID: 4423, start-end: 05.04.2013-01.08.2013).

1. INTRODUCTION

Consumption is one of the most debated topics in literature of economics. After the great depression, absolute income hypothesis (AIH) of J. Maynard Keynes gains a momentum. AIH claims that current consumption changes as current income changes. The model postulates some concepts such as marginal and average propensity to consume (APC). AIH states that APC declines as income accumulates. Some short run time series empirical studies confirm Keynesian model whereas (i.e., Simon Kuznets), some other long run time series models disconfirm Keynesian model as they observe that APC might decrease in the short run but not in the long run. The controversies among output of short run and long run time series econometrical models cause a new concept of 'consumption puzzle' in the related literature. Besides AIH, in order for one to understand the basics and dynamics of consumption pattern, he/she might need to search, as well, the alternative consumption models of relative income hypothesis (RIH), inter-temporal consumption choice model (ITCCM), life cycle income hypothesis (LCIH), permanent income hypothesis (PIH), and, random walk hypothesis (RWH). James S. Duesenberry's RIH indicates that consumption is not only a function of current income; it is also a function of past values of income. Moreover, according to Duesenberry, the household's consumption is not independent from the group or environment in which they live. Irving Fisher develops ITCCM in which individuals can adjust consumptions between today and future according to the given interest rate. They might consume all their income at the current time or save some part of income for future consumption. Furthermore, they could also choose to consume more than today's income by borrowing at the current interest rate.

LCIH is developed by Franco Modigliani, who suggests that individuals save money for spending purpose at the time that

they get retired or unwilling to study. Thus, they could spend savings during the old ages. Then, people have first negative savings, and, later, positive savings through their lifetime. Fisher' model became a source of inspiration for Friedman and he later, designed PIH based on adaptive expectations. Individuals realize their consumption according to their permanent income that they expect to earn during their whole life and they can smooth their consumption when changes in their income can be predicted. Therefore, consumption won't change since it is the function of permanent income. Only, unexpected changes in permanent income could change the consumption. Following permanent income concept, Hall has adopted "rational expectation" instead of "adaptive expectation." This new model, RWH, argues that all information is already available in previous consumption behavior, so, changes in consumption cannot be estimated and a possible change in consumption just follows random walk. At this approach also, consumption deviates from its trend through surprise changes in permanent income. However, on the other hand, under the circumstances of liquidity constraints, borrowing constraints, uncertainty of income flows etc., the consumption smoothness does not occur. Hence, the consumption might be excess sensitive even if income changes are foreseen. This paper considers, first, consumption literature in general, later, observes mostly the empirical evidences of PIH and RWH models in section 2. Paper then employs its methodology and data in section 3. The final section of conclusion and policy implications reveal some policy proposals to provide policy makers with information about the dynamics of consumption path in Turkey.

2. LITERATURE REVIEW

One may follow, throughout literature review, some seminal papers observing the possible determinants and/or decompositions of household's consumption. Sivri (2010), DuJuan and Seater (2007), McIntyre (2007), Madsen and McAleer (2000), Kim (1996), Gali (1991), Blinder et al. (1985) confirm PIH. Parker and Preston (2002), Japelli and Pistaferris (1998), Campbell and Mankiw (1990), Zeldes (1989) do not support PIH. Maras (2006), Falk and Lee (1998) support RWH. Bilgili (2006), Coban (2005), Yu (2005), Flavin (1984) disconfirm RWH. Okçu (2008), Vardareri (2007), Gerdtham and Johansson (2004), Özer (2001), Garcia et al. (1997), Hayashi (1984) disconfirm PIH and RWH. Some papers reveal that there exists a co-integration relation between income and consumption as in Arioglu and Tuan (2011), Abeysinghe and Choy (2004), Craigwell and Rock (1995) and Jin (1995). Table 1 yields the empirical evidences of related models.

In general, it might be concluded that there is a co-integration relationship between consumption and income. Moreover, consumption is generally found excessively sensitive to both expected and unexpected income changes. Due to some reasons, individuals/households are not able to smooth their consumption. One might consider, as well, some other relevant works within the literature such as Blanchard and Quah, (1989), Bilgili (1997, 2007), Acemoğlu and Scott (1994) Chen (2006), and, Fisher and Hyeon-Seung (2006).

3. METHODOLOGY AND DATA

In this research, Turkish quarterly data (TCMB, 2013) for consumption and income, spanning from 1998:1 to 2012:1, are employed. Full definitions of each variable are depicted in Appendix Table 1. The paper first checks stationary conditions. Secondly, it employs auto-regressive process (AR) to differentiate income into 'permanent' and 'temporary' parts. Finally, permanent income variable resulted from the first AR, will be differentiated through new AR process. Thus, permanent income changes will have two parts; "permanent changes" and "temporary-surprise changes."

3.1. Stationary Tests

At the first stage of time series econometric analyses, the stationary tests are needed to prevent researchers from 'artificial regression' (or unit root). Artificial regression might lead biased outcome. In order to reach stationarity test results, one may follow simultaneously (a) Augmented Dickey Fuller (ADF) approach, (b) autocorrelogram function (ACF) analyses, (c) Partial ACF (PACF) analyses, and, (d) Ljung-Box Q higher order serial correlation test statistics. Then the numbers of lag lengths are optimized for equilibriums at which residuals became white noise. Otherwise, if one had determined the lag length by the Akaike Information Criteria (AIC) and/or Schwartz Information Criteria (SC) automatic lag length selections in the process of stationarity analyses, as suggested by some software programs, then, he/she may not have reached unbiased, consistent and efficient stationarity tests' results.

At this step, stationarity of X_t series can be illustrated through three forms of equations (Enders, 1995);

$$\Delta X_t = \delta X_{t-1} + \sum_{i=1}^{m} \alpha_i \Delta X_{t-i} + u_t \quad (1)$$

$$\Delta X_t = \beta_1 + \delta X_{t-1} + \sum_{i=1}^{m} \alpha_i \Delta X_{t-i} + U_t \quad (2)$$

$$\Delta X_t = \beta_1 + \beta_2 t + \delta X_{t-1} + \sum_{i=1}^{m} \alpha_i \Delta X_{t-i} + \varepsilon_t \quad (3)$$

Equation (1) excludes constant and trend of series; Equation (2) considers additionally the constant term. And Equation (3) employs both constant and trend terms. Table 2 reveals that the consumption and income series are not stationary at their levels hence they are not I(0). In case series is differenced once, they stylize from their root. For choosing the best model among stationary models after the relevant process, the information criteria could help us. A model containing the lowest AIC/SIC criteria value might be considered best among others to follow. Hence model B is chosen for further analyses.

3.2. Hypothesis Tests for the Assumptions of Consumption

There are different estimation techniques. AR method might be preferable to follow among other methods, due to its some desirable statistical properties. AR (p) process keeps tracks of previous/past values of a series. AR process for X_t.

Table 1: Consumption literature

Authors	Period	Data	Results
Arioglu and Tuan (2011)	1988:3-2009:3, Turkey	CPI, total employment, urban-rural employment, interest rate, inflation rate, consumption and GNP	There are two co-integration relationships, one is between consumption and GDP; other is between consumption and interest rate
Sivri (2010)	1987:1-2007:3, Turkey	Nutrients-beverage, semi-durable-nondurable and service expenditure	Osborn model is valid for service expenditures and only surprise policies affect them
Bilgili (2010)	The quarterly data 1988:1-2003:1, Turkey	Private consumption, government consumption and Private investment	Private consumption and government consumption are positively associated with private investment
Okcu (2008)	1987:1-2007:3, Turkey	Consumption, income	Consumption is affected by its past value instead of income
DeJuan and Seater (2007)	1980-1991-USA	Consumption, income, socio-economic and demographic variables	Results support PIH
McIntryre (2007)	1978:1-1998:4, USA and Canada	Households nondurable goods and service consumption, labor income, interest rate, consumer confidence and sensitivity index	Predictive power of consumer confidence is consistent with the PIH
Vardareri (2007)	1988:1-2005:3, Turkey	Per capita consumption, income	Excess sensitivity and liquidity constraints cause AIH
Bilgili (2006)	1987:1-2003:4-Turkey	Final consumption, GDP, public expenditure, tax and transfer payments	RWH is invalid and consumption has both excessive smoothness and excessive sensitivity
Maras (2006)	1960-2004, Turkey	Private-public consumption, income	RWH is the best explanatory hypothesis for both private and public spending in Turkey
Coban (2005)	1987:1-2003:4-Turkey	GDP, private consumption expenditure, tax and transfer payments	Consumption can be affected by expected and unexpected income changes
Yu (2005)	1991-2002-UK	Nondurable consumption, dummy variables for macro values such as seasonality, interest rate and demographic variables	Current consumption is sensitive to one lagged financial variable values. It is not confirmed that failure of REPIH is either myopic or liquidity constraints
Abeysinghe and Choy (2004)	1978:1-2003:4, Singapore	Consumption and income	There is no co-integration relationship
Gerdtham and Johannesson (2004)	1980-1986, Sweden	Per capita income, average community income and average community income inequality	AIH is supported
Slacalek (2004)	1970-2003 26 Industrialized countries panel data	Consumption, wealth level	There is a co-integrated relationship between consumption and wealth only for panel data
Parker and Preston (2002)	1981:1-1998:2, Monthly households questionnaire data, USA	Nondurable and service expenditure, 3 monthly real interest rate, discrimination of constraint and unconstraint consumers, demographic variables	Imperfect markets, precautionary savings, credit constraints, expectation of increasing unemployment make difficult to smooth consumption
Özer (2001)	1991-February-1991-December, Turkey, cross-section data	Durable-nondurable and service expenditure	Linear AIH is the best model explaining consumption
Madsen and McAleer (2000)	1972:1-1997:1-USA	Consumption, income, uncertainty, inflation expectation and liquidity constraints	Consumption is less sensitive to the current income in comparison with other studies
Falk and Lee (1998)	1947:1-1995:1-USA	Treasury papers interest rate, inflation rates, per capita real disposable income, nondurable and service consumptions	Failure of separating labor income and consumption as permanent and transitory components result in wrongly evaluated applications for rational expectations PIH (REPIH)
Jappelli and Pistaferri (1998)	1989-93, Italy	Consumption, income, inflation expectation, income risk	Income risk supports precautionary savings
Garcia, and Ng (1997)	1980-1987-USA	Race, gender, marital status, income and financial securities	Excess sensitivity is valid among liquidity constraints. It is suggested that myopic behavior is not explanatory tool for denial of REPIH but might only explain excess sensitivity
Lage (1997)	1974-1992-Michigan households cross-section data	Consumption, income	PIH is sensitive for learning process about income changes are permanent or transitory
Kim (1996)	1953:2-1993:1-USA	Consumption, labor and capital income	Consumption deviates from PIH less than % 4

(Contd...)

Table 1: ***(Continued)***

Authors	Period	Data	Results
Craigwel and Rock (1995)	1958:1-1990:3, Canada	Consumption, income, public expenditure, unemployment rate, interest rate, inflation and relative prices	Income, public expenditure, interest rate, wealth and liquidity constraints are explanatory variables for consumption
Jin (1995)	1960-1988, OECD countries	Consumption, disposable income	Consumption and income are co-integrated
Gali (1991)	1947:1-1988:3-USA	Consumption, income, interest rate	Consumption show % 80 less variability according to PIH
Campbell and Mankiw (1990)	1953:1-1985:4-USA	Disposable income, nondurable goods and service expenditures	% 50 of Individuals consumes their current income rather than permanent income
Zeldes (1989)	1968 USA households cross-section data	Consumption, real disposable income, interest rate after taxing, real estate wealth, yearly nutrient requirement	Inability of borrowing has impact on essential part of population
Blinder et al. (1985)	1954:1-1984:4-USA	Tax, gross interest payments to individuals, disposable income, public fees except taxes, nondurable goods and service expenditures, relative prices and interest rates	Unexpected income and wealth changes cause consumption changes. Temporary tax changes have little effect on consumption like as PIH suggestion. Interest rates have unimportant negative, inflation and relative prices have negative impact on consumption
Flavin (1984)	1929-1981, USA	Nondurable consumption goods, unemployment rate, income	AIH is insufficient model and liquidity constraints cause consumption to be excessive sensitivity to current income
Hayashi (1984)	1981:2-1982:2-Japan	Consumption, income	PIH/RWH is invalid because of excess sensitivity

Table 2: ADF unit root test output through ACF - PACF ljung-box test statistics

Hypothesis Testing	ADF/DF statistic	% 5 c.v.	P	Lag (L)
Hypothesis –I(0) level-lncons				
A Model (None)	2,703	−1.948	0.998	6
B Model (with constant)	−0.75	−2.921	0.824	6
C Model (with constant and trend)	−2.334	−3.499	0.409	4
Hypothesis –I(1)-lncons				
A Model (None)	−2.403	−1.947	0.0171	3
B Model (with constant)	−4.125	−2.921	0.0021	5
C Model (with constant and trend)	−4.05	−3.502	0.0131	5
Hypothesis –I(0) level -lninc				
A Model (None)	1.965	−1.947	0.987	5
B Model (with constant)	−0.299	−2.92	0.918	5
C Model (with constant and trend)	−2.903	−3.499	0.17	4
Hypothesis –I(1)-lninc				
A Model (None)	−2.277	−1.947	0.0233	3
B Model (with constant)	−3.359	−2.92	0.0172	4
C Model (with constant and trend)	−3.319	−3.5	0.0747	4

ADF: Augmented Dickey Fuller

$$X_t = \alpha_0 + \alpha_1 X_{t-1} + \alpha_2 X_{t-2} + \alpha_3 X_{t-3} + \ldots + \alpha_p X_{t-p} + \varepsilon \quad (4)$$

In AR process, a variable could be explained with its own previous or lagged values. To understand the characteristics of a time series, researcher needs to observe the series for at least 2-3 years. At the same time, researcher needs to know as well that choosing more lagged values diminishes the degrees of freedoms of the estimation.

In the Table 3, according to the p-values and information criteria, lag length is chosen as L(4) for both consumption (dlncons) and income (dlninc). After regressing dlncons and dlnincs series on their fourth lagged values, residuals will be 'temporary' part of that relevant series. And if one subtracts temporary part from observed (original) data, he/she reaches the 'permanent' part of the series. For choosing the best model among others, the information criteria could help us. A model containing the lowest AIC/SIC criteria value might be considered best among others to follow.

3.2.1. Theoretical and practical underpinnings of PIH

Permanent consumption is function of interest rate (r) borrowing/lending, ratio of nonhuman wealth to income (w) and tastes and preferences (u) within the PIH (Friedman, 1957. p. 26) as is given in Equation (5).

$$C_p = k\,(r,w,u)\; Y_p \rightarrow k>0 \quad (5)$$

The parameters r, w and u can affect the value of k, and, thus, they can change the amount allocated from permanent income to consumption. On a conceptual basis, consumption and income have two separated components; permanent (P) and transitory (T) (Friedman, 1957. p. 26) as indicated by Equation/6) and (7).

$$C = C_p + C_T \quad (6)$$

$$Y = Y_p + C_T \quad (7)$$

PIH's basic assumptions are (i) there is no correlation (p) between permanent-temporary parts of consumption, (ii) there exists no correlation between permanent-temporary parts of income, and, (iii) there appears to be no correlation between temporary consumption and temporary income (Friedman, 1957. p. 26,27). Equation (8), hence, implies that individuals might

Table 3: Consumption (dlncons) and Income (dlninc) series' AR(p) trial results

Lag (L)	L(1)	L(2)	L(3)	L(4)	L(5)	L(6)	L(7)	L(8)
dlncons								
AIC	−3.7091	−3.7172	−3.6911	−4.0062	−3.9154	−3.9319	−3.9136	−3.9979
SIC	−3.6361	−3.6435	−3.6168	−3.9312	−3.8396	−3.8554	−3.8364	−3.9199
P (5%)	0.1518	0.3348	0.4409	0.0203	0.3353	0.1006	0.5491	0.1644
dlninc								
AIC	−3.655	−3.8173	−3.6712	−3.9343	−3.8273	−3.8852	−3.7854	−3.8735
SIC	−3.582	−3.7436	−3.5969	−3.8592	−3.7516	−3.8087	−3.7082	−3.7955
P (5%)	0.8356	0.0068	0.6283	0.0228	0.541	0.0516	0.785	0.0556

save temporary amount of their income instead of spending. Individuals/households can smooth their consumption according to the permanent income. Thus, changes in current income are not able to influence the current consumption. At this phase of research, paper launches the tests for PIH hypothesis' assumptions. Thereby, different combinations of current and lagged values of consumption and income are tested through ordinary least squares techniques.

$$\rho C_P C_T = \rho Y_P Y_T = \rho Y_T C_T = 0 \quad (8)$$

Table 4 considers the output of testing the first assumption of PIH. One may claim that at least some parameters are not statistically significant, and, that null hypothesis might be accepted, and, hence, that model is not statistically significant. Table 5 yields the output of testing second assumption of PIH and explores that the model is not statistically meaningful. Until this stage, results are in favor of PIH. The third assumption is especially critical for the PIH.

In the Table 6, model is statistically significant. So, this model must be checked in terms of parameters. One lagged value of temporary consumption; C_T (−1) is statistically significant at % 10 level. It means that consumption lagged value might affect its current value. And temporary income (Y_T) parameter is significant at 1% level. This conclusion, however, disconfirms PIH's third assumption.

3.2.2. Theoretical and practical underpinnings of RWH

RWH might be called PIH with rational expectations PIH (REPIH). This is because of substituting rational expectations for adaptive expectations in the model. With this substitution, individuals determine their consumptions through all relevant information they have from past, and through all relevant information they will have had from current and future times. Due to evaluating all probabilistic information, change in consumption cannot be estimated and, instead, can follow random walk. All needed information might be inside the one lagged consumption (C_{t-1}) (Hall, 1978. p. 975). Under the PIH framework, Equation (9) follows stochastic process (Hall, 1978. p. 975).

$$C_t = C_{t-1} + \varepsilon_t \quad (9)$$

Consumers might change their consumptions only with unexpected permanent income changes as in PIH. There might happen, on the other hand, (i) 'excess sensitivity' and (ii) 'excess smoothness' that violate the Equation (9). Excess smoothness occurs when individuals continue to smooth their consumption even if individuals face an unexpected change in their permanent income. Excess sensitivity appears, however, when individuals

Table 4: Test of relationship between Y_P−Y_T as Y_P is dependent variable

Variable	Coefficient	Standard error	t-statistic	P
Y_T	−0.026,740	0.047,488	−0.563,100	0.5762
Y_P (−1)	0.014,214	0.138,809	0.102,397	0.9189
Y_P (−2)	−0.358,329	0.144,640	−2.477,391	0.0171
Y_T (−1)	−0.044,510	0.046,313	−0.961,068	0.3418
Y_T (−2)	−0.070,417	0.046,581	−1.511,699	0.1378
C	0.015,688	0.002,788	5.626,745	0.0000
			F-statistic	1.832,543

Table 5: Test of relationship between C_P−C_T as C_P is dependent variable

Variable	Coefficient	Standard error	t-statistic	P
Y_T	−0.035,013	0.051,744	−0.676,648	0.5022
C_P (−1)	−0.202,557	0.152,910	−1.324,681	0.1921
C_P (−2)	−0.188,201	0.159,655	−1.178,796	0.2448
Y_T (−1)	0.011,407	0.048,262	0.236,363	0.8142
Y_T (−2)	−0.040,766	0.047,623	−0.856,006	0.3966
C_0	0.015,917	0.003,211	4.956,882	0.0000
			F-statistic	0.646,418

Table 6: Test of relationship between C_T−Y_T as C_T is dependent variable

Variable	Coefficient	Standard error	t-statistic	P
Y_T	0.746,819	0.089,886	8.308,490	0.0000
C_P (−1)	−0.269,046	0.151,506	−1.775,814	0.0827
C_P (−2)	0.086,783	0.153,761	0.564,399	0.5753
Y_T (−1)	0.131,419	0.144,141	0.911,736	0.3669
Y_T (−2)	−0.065,699	0.145,262	−0.452,276	0.6533
C_0	−0.000,294	0.002,834	−0.103,608	0.9180
			F-statistic	15.78,672

respond to even anticipated changes in their permanent income. This paper will observe if Turkish data follows smoothness or excess sensitivity or RWH (REPIH). The paper, in this section, will continue to launch AR process to observe if individuals' consumption behavior confirms rational expectation model of consumption (RWH). To this end, paper examines the effect of permanent income on consumption. Thereby, paper, investigates, overall, the "permanent-transitory changes" or "expected-unexpected changes," the impact of permanent income (Y_p) on current (or total) consumption (C_T), the impact of expected permanent income changes (ΔY^{PC}) on consumption changes (ΔC_t), and, the influence of unexpected permanent income changes (ΔY^{PT}) on consumption changes (ΔC_t).

Table 7: Tentative and final AR(p) estimations for Y_P series

Lag (L)	1	2	3	4	5	6	7	8
Y_P								
AIC	−61.20,264	−6.24,149	−6.134,645	−6.37,552	−6.306,549	−6.342,087	−6.261,691	−6.35,148
SIC	−60.44,506	−6.16,501	−6.057,428	−6.29,756	−6.22,782	−6.262,581	−6.181,395	−6.27,038
P (5%)	0.7,751	0.0286	0.6991	0.083	0.5489	0.1081	0.7351	0.0654
DW	1.884,394	1.824,469	1.732,707	1.667,035	1.787,707	1.815,027	1.76,840	1.702,382

Table 7 reveals, first, tentative AR processes with L(2), L(4) and L(8) and, later, points out final AR with L(4) throughout information criteria evaluations. By regressing permanent income on its fourth lagged values, residuals will explore unexpected changes.

When residuals are extracted from original data (Y_p), the expected (anticipated) changes in permanent income will have obtained. According to the Table 8, model as a whole is statistically significant and Y_p coefficient is, as well, found significant at 10% level. Table 8 supports the argument that consumption is the function of permanent income. Table 9 states that the model is statistically meaningful and, that ΔY^{PT} might lead consumption to change at 10% level. Eventually Tables 8 and 9 confirm RWH. On the other hand Table 10 yields excess sensitivity.

3.2.3. Expansion of the tests

To measure uncertainty and liquidity constraints, additional variables are added to the model. These variables are consumer price index (CPI), demand deposit interest rates for 3, 6 and 12 months, dummy variables related to 2001 and 2008 economic crises in Turkey, respectively. All variables are stationary at first differences I(1) except CPI.

Variables are transformed into their logarithmic values. In order for readers to be able to follow both significant and insignificant parameters within in the model, we have posted both tentative and final models. Lag values of C_p, Y_p and Y_T are also added to regression. According to the Table 11, statistically insignificant variables are dropped from regression. After this, others are regressed again. In the Table 12, it is observed that Y_p, Y_p (−1), 3 monthly interest rate, C_p, C_p (−1) and 6 monthly interest rate are all found significant.

Lag values of C_T, Y_p and Y_T are also added to regression. Considering the output of Table 13, statistically insignificant variables are dropped from regression. The updated results are shown in Table 14. One may notice that all independent variables are found significant as well.

4. CONCLUSION

This study considers the evaluation of permanent income and RWH simultaneously. Results yield that Turkish households are sensitive to changes in expected and unexpected permanent income. Upon the conclusions, hence, one may claim that households' behaviors both confirm and disconfirm the RWH/REPIH. Since consumption level is determined by current income level, one states, as well, that AIH might be able to explain relatively better the Turkish private consumption pattern than others do. However, because of low R^2 value of macro models in which sensitivity-smoothness is tested, one might expose that income is not a unique dominant factor affecting the consumption, and, there might be other parameters beyond the income/permanent income. Financial tools diversity, such as credit cards, consumer loan, etc. give opportunity for

Table 8: The influence of Y_p on C_t

Variable	Coefficient	Standard error	t-statistic	P
Y_P	0.800,506	0.418,406	1.913,228	0.0615
C	0.001,943	0.006,793	0.286,036	0.7760
			F-statistic	3.6604

Table 9: The impact of ΔY^{PT} on ΔC_t

Variable	Coefficient	Standard error	t-statistic	P
ΔC_{t-1}	−0.627,158	0.143,986	−4.355,678	0.0001
ΔC_{t-2}	−0.270,562	0.137,744	−1.964,233	0.0557
ΔY_t^{PT}	0.766,908	0.441,382	1.737,517	0.0891
C_o	−0.001,404	0.005,871	−0.239,179	0.8121
			F-statistic	9.9916

Table 10: The impulse of ΔY^{PC} on ΔC_t

Variable	Coefficient	Standard error	t-statistic	P
ΔC_{t-1}	−0.705,898	0.134,182	−5.260,749	0.0000
ΔC_{t-2}	−0.334,669	0.132,419	−2.527,347	0.0152
ΔY_{t-1}^{PC}	2.094,868	1.243,048	1.685,267	0.0990
C_0	0.000,740	0.005,702	0.129,708	0.8974
			F-statistic	9.5626

Table 11: An expanded model of C_p: Tentative model

Variable	Coefficient	Standard error	t-statistic	P
C_T	0.011,152	0.044,348	0.251,462	0.8029
Y_P	0.782,965	0.089,117	8.785,804	0.0000
Y_T	−0.009,759	0.042,764	−0.228,201	0.8208
Dln month 3	0.062,106	0.028,838	2.153,654	0.0382
Dln month 6	−0.090,471	0.052,001	−1.739,808	0.0907
Dln month 12	0.034,392	0.034,088	1.008,926	0.3199
lncpi	−0.001,768	0.002,170	−0.814,936	0.4206
C_p (−1)	−0.411,082	0.146,718	−2.80,1847	0.0082
Y_p (−1)	0.324,500	0.145,213	2.234,652	0.0319
Y_p (−2)	0.028,837	0.089,255	0.323,090	0.7485
Y_T (−1)	0.041,328	0.033,175	1.245,749	0.2211
Y_T (−2)	0.030,182	0.035,701	0.845,403	0.4036
dummy2001	−0.000,841	0.005,289	−0.159,029	0.8746
dummy2008	0.000,102	0.005,277	0.019,300	0.9847
C_0	0.019,249	0.019,776	0.973,375	0.3370
R^2	0.814,298		F-statistic	10.96,243

Table 12: Reduced form of C_P: Final model

Variable	Coefficient	Standard error	t-statistic	P
Y_P	0.750,199	0.069,152	10.84,858	0.0000
Dln month 3	0.056,837	0.019,056	2.982,685	0.0046
Dln month 6	−0.050,827	0.020,233	−2.512,037	0.0157
C_P (−1)	−0.361,070	0.129,096	−2.796,914	0.0076
Y_P (−1)	0.284,543	0.129,254	2.201,423	0.0329
C_0	0.003,588	0.001,412	2.541,204	0.0146
R^2	0.799,976		F-statistic	35.99,460

Table 13: An expanded model of C_T: Tentative model

Variable	Coefficient	Standard error	t-statistic	P
C_P	−0.523,453	0.655,272	−0.798,833	0.4299
Y_P	0.539,397	0.599,350	0.899,969	0.3745
Y_T	0.685,718	0.109,374	6.269,472	0.0000
Dln month 3	0.072,756	0.105,057	0.692,542	0.4933
Dln month 6	0.059,018	0.174,042	0.339,101	0.7366
Dln month 12	−0.164,749	0.101,213	−1.627,741	0.1128
lncpi	0.052,367	0.087,858	0.596,043	0.5551
C_T (−1)	−0.399,814	0.157,004	−2.546,525	0.0156
C_P (−1)	−0.182,849	0.570,778	−0.320,350	0.7507
Y_P (−1)	0.350,781	0.547,423	0.640,787	0.5260
Y_P (−2)	0.298,201	0.314,225	0.949,005	0.3493
Y_T (−1)	0.202,260	0.179,471	1.126,976	0.2676
Y_T (−2)	0.013,181	0.125,687	0.104,876	0.9171
dummy2001	−0.018,233	0.017,577	−1.037,343	0.3069
dummy2008	0.003,232	0.018,185	0.177,722	0.8600
C_0	−0.009,052	0.009,747	−0.928,677	0.3596
R^2	0.746,558		F-statistic	6.676,863

Table 14: Reduced form of C_T: Final model

Variable	Coefficient	Standard error	t-statistic	P
Y_T	0.690,856	0.080,136	8.621,060	0.0000
Dln month 3	0.096,167	0.036,202	2.656,367	0.0108
Dln month 12	−0.141,773	0.039,332	−3.604,551	0.0008
C_T (−1)	−0.231,668	0.079,366	−2.918,996	0.0054
C_0	−0.002,263	0.002,540	−0.890,812	0.3777
R^2	0.715,167		F-statistic	28.87,448

households to spend more than their income. Consumers initially spend without carefully but later unbalanced income-purchasing level makes people excess sensitive to expected income changes. Furthermore, this conflicting behavior of Turkish consumers might be observed in detail in future potential studies. For instance, Turkey is a developing country and opens to financial and/or structural crisis more than developed countries. Income flows sometimes could not be foreseen and might be fragile. Thus, consumers might be excess sensitive. Therefore, social factors, myopic consumers, cultural features, high birth rate, younger population and demographic properties lead spending habits to differentiate. Finally, liquidity constraints, borrowing constraints, government borrowing and growth nexus (see, for instance, Doğan and Bilgili, [2014]), underdeveloped financial market, and lack of education might be causes of this output which conflicts with RWH/REPIH.

Stable macroeconomic environment, developed financial markets, current or future regulations, education level etc. shape households' consumption pattern in the long run. Overall one may conclude that surprised policies as well as foreseen policies will have the impacts on Turkish consumers. A future work might, on the other hand, be launched to determine the relative degrees of effectiveness of anticipated and unanticipated policies.

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APPENDIX TABLE

Variable	Definition
Lncons	Logarithmic consumption values
Lninc	Logarithmic income values
Dlncons	Differentiated logarithmic consumption values
Dlninc	Differentiated logarithmic income values
AIC	Akaike's information criterion
SIC	Schwarz's information criterion
P	Probability
C_P	Permanent consumption
Y_P	Permanent income
C_T	Temporary consumption
Y_T	Temporary income
Ct	Current consumption
Ct-1	One lag of current consumption
ε_t	Residuals series
AR	Autoregressive process
ΔC_t	Current consumption changes
ΔY_{PC}	Expected permanent income changes
ΔYPT	Unexpected permanent income changes
dlnmonth3	Differentiated 3 monthly demand deposit interest rate
dlnmonth6	Differentiated 6 monthly demand deposit interest rate
dlnmonth12	Differentiated 12 monthly demand deposit interest rate
dummy2001	Financial Crisis in Turkey for 2001
dummy2008	Mortgage Crisis in 2008
lncpi	Logarithmic Consumer Price Index