An Empirical Examination of Relative Income Hypothesis: Evidence from Pakistan

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Abstract

The present study empirically investigates the relevance of the various specifications of relative Income hypothesis (RIH) in the case of Pakistan. World Development Indicators' data is analyzed over the period of 1986 to 2016. This study tests the existence of income, consumption, and habit ratchet effects at the National level. Based on stationarity tests the techniques of Box Jenkin, Two Stage Least Square, Generalized Methods of Moments, and Limited Information Maximum Likelihood Method are utilized to estimate the four versions of relative income hypothesis. Findings of this research validate the significant prevalence of three types of ratchet effects in case of Pakistan. In Duesenberry-Eckstein-Formm (DEF) model, habit ratchet effect is found to be stronger than income ratchet effect. Whereas in modified Davis model Consumption ratchet effect exceeds the habit ratchet effect. It is observed that long run marginal propensities to consume are closer to one which demonstrates smooth consumption behavior over long period in Pakistan. The estimated short run marginal propensities to consume are observed to be less than long run marginal propensities to consume that accords with the existing consumption theory. These findings imply that all ratchet effects put pressure upon consumers to maintain the highest standard of living enjoyed in the past. In this process households do not retain balance between savings and consumption. Based on these findings, it is suggested to consider the impact of societal factor in formulating policies to shape the consumption patterns.

Key Words: Relative Income Hypothesis, Propensity to Consume, 2SLS, GMM, LIML, Income ratchet effect, consumption ratchet effect, Habit ratchet, Box Jenkin, previous peak income, previous peak consumption, habit persistent effect

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1. Introduction

Consumption is the ultimate purpose and a key source of economic activities (Bonsu & Muzindutsi, 2017). On one hand it is influenced by several economic

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and social factors, while on the other hand its analysis guides market activities and policy decisions. (Çağlayan & Astar, 2012; Varlamova & Larionova, 2015). It is a vital economic variable as it contributes to fifty-eight percent of total world GDP (World Bank, 2018[4]). In Pakistan, the role of consumption is more vibrant because Pakistan's economy is known as consumption led economy (Government of Pakistan, 2012-13). According to the World Bank (2018) the share of consumption in Pakistan's GDP is eighty percent. The vitality and significance of consumption renders it as an attractive area for research. Although substantial literature analyses various aspects and determinants of consumption, there are several dimensions that need further exploration. The social aspects of consumption behavior generally have not been paid the due attention. Limited number of studies analyze the social aspects of consumption behavior. The Relative Income Hypothesis (RIH) is among one of the few theories that highlights this factor and hypothesizes that the social aspect of income significantly affects the consumption behavior (Morgan & Christen, 2005). There are very few studies that empirically analyze RIH in the case of Pakistan (Akhtar, 1983; Khan, Khan, Chaudary, & Fedorova, 2015). Keeping in view the significance of the subject and the existing research gap, the present study investigates the consumer behavior at the national level to provide a quantitative relevance of RIH for Pakistan.

1.2. Contribution and motivation

The present research significantly contributes to the existing literature by updating, upgrading, and extending, the empirical analysis of RIH in case of Pakistan. The existing national level findings on RIH are updated in the present work by utilizing more recent data set. Present study employs advanced techniques of regression analysis to upgrade the quantitative analysis of RIH. This study covers all the four specifications of RIH including Original Duesenberry, Duesenberry-Eckstein-Formm (DEF), Davis, and Modified Davis Models, whereas the previous work analyzes only the first two versions. The computation of long run and short run consumption propensities for all estimated RIH models provides a useful insight in to the consumer behavior for academia and policy makers. In a nutshell empirical analysis of social aspect of consumption behavior executed in this study would provide a base for designing appropriate commercial, labour, and taxation policies.

The organization of this paper is as follows: Section 1 provides an introduction of the study and section 2 reviews the literature. Section 3 presents details of data, data handling techniques, and the methodologies for static and dynamic time series analyses. In section 4 the findings are presented and discussed thoroughly. Finally,

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4 *Retrieved from https://data.worldbank.org/indicator/NE.CON.PRVT.ZS?end=2018&start=1960&view=chart*

section 5 concludes the research article and provides policy recommendations based on the findings of this study.

2. Literature Review

The concept of consumption plays significant role in economic theory. According to Adam Smith consumption is the sole end and purpose of production (Boulding, 1945). Being an important determinant of aggregate demand, the accurate estimation of consumption is especially important for efficient management of the economy (Khan & Ahmad, 2014). The formulation of appropriate policy measures regarding consumption behavior requires the identification of its vital determinants. Numerous factors are highlighted in the literature that determines the consumption behavior. However, the standard consumption theory evolves around the prime relationship of income and consumption (Ammad & Ahmed, 2018; Bibi, 2010). Consumption-income analysis has been discussed in many dimensions and various hypothesis are designed to examine the household consumption behavior. Most of the hypotheses focus on the consumer assuming it as only a physical being and ignored the social aspects of his/her life (SIN). Consequently, majority introductory textbooks of Economics ignore the social influences while analyzing the consumer behavior and assumed it simple and rational process (Goodwin, et al., 2015). The major hypotheses based on consumption-income relationship includes Absolute Income Hypothesis (AIH), Permanent Income Hypothesis (PIH), Relative Income Hypothesis (RIH), and Life-cycle Hypothesis (LCH). All of these hypotheses attained special attention at their times. The RIH is the one that could not maintain its importance in economics discipline due to the ignored societal factors. Duesenberry in his book "Income, Saving and the Theory of Consumer Behavior" reformulated the Keynes's consumption function as RIH. He elaborates the concepts of Smith, Marx, and Veblen in his analysis[5,6,7]. Duesenberry (1949) formulated the RIH based on the concepts of ratchet effect and the demonstration effect. Ratchet effect refers to the households' behavior when they resist and do not decrease their consumption in relation to their income (Dwivedi, 2005). They try to maintain their previous high standards of living. While in Demonstration effect consumer tries to imitate his/her neighborhood in his consumption decision (Sun & Wang, 2013). Source of this effect (Demonstration effect) is consumer's consumption standards which he sets in comparison with another person who is next to him in the society. This is kind

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5 Adam Smith in his book *Wealth of Nations* describes that *"By necessaries I understand not only the commodities which are indispensably necessary for the support of life, but whatever the custom of the country renders it indecent for creditable people, even of the lowest order, to be without (Smith, 1776)".*

6 Karl Marx (Marx, 1847) also described that *"A house may be large or small; as long as the neighboring houses are likewise small, it satisfies all social requirement for a residence. Let next to the little house a palace arises, and the little house shrinks to a hut"* (Verme, 2013).

7 Veblen explained in the race of illustration of the wealth through the continual competition of individuals. People's standard of ordinary comfort living does not remain same it moves upward as their unsatisfied wants convert into necessities (Veblen, 1899).

of keeping up Joneses theory of consumption in which narrow gap exists between consumer behavior with other consumers on a higher consumption standard. This theory confronted much criticism despite of its undeniable aspect that most of the consumption results due to social interactions. It is argued that on which basis the reference group is chosen with which the comparison is made because it is nearly impossible to specify a certain reference group for each commodity. To address this problem income level has been taken as general reference group as it is reasonable to assume that people mainly follow other's people who have same income class as themselves. Another criticism is how to test the magnitude of demonstration effect of lower income bracket people as it cannot be empirically tested (Hadden, 1965).

Globally a limited number of researchers explore the consumption-income relationship qualitatively and quantitatively under the theme of RIH (Alpizar , Carlsson , & Stenman, 2005; Corrales & Mejia, 2009; Cuadrado & Long , 2011). Singh and Kumar (1971) in their empirical analysis describes that RIH provides a good presentation of the consumption behavior for all countries analyzed in their study including Canada, Finland, Guatemala, Honduras, India, Japan, Philippines, Sweden, United Kingdom, and the United States. Their findings conclude that consumption is a better indicator of living standard as compared to income and process of habit formation is continuous contrary to what was implied by Duesenberry's original specification. They highlight that underdeveloped nature economies i.e., Honduras and Guatemala have high MPC than developed countries. Easterlin (1974) considers relative income as sole and important determinant of consumption behavior. A theoretical model of the consumption behavior is presented by Palley (2008) as "Relative Permanent Income Theory of Consumption". This work synthesizes the seminal contributions of Keynes (1936), Friedman (1957) and Duesenberry (1949). The findings of this study demonstrate that the rich households have higher MPCs and lower APCs. Due to keeping up with Joneses behavior, consumption inequality is less than income inequality. Corrales and Mejia (2009) provide the significance evidence for RIH is in the case of Latin America, Brazil, Mexico, Argentina, and Columbia. There are some studies which establish that both absolute and relative income play their roles in determining consumption behavior. Alpizar, Carlsson, and Stenman (2005) describes that both relative and absolute income are equally important for consumer and he/she always make decisions based on the properties of goods.

In the case of Pakistan specifically a very few studies quantitatively analyze this hypothesis including Akhtar (1983) and Khan, et al. (2015). The current work is designed to overcome the limitations of prevailing studies and to provide a supplement to the existing literature on RIH with reference to Pakistan. Akhtar (1983) examines the validity of RIH for Pakistan by using the aggregated data set of East and West Pakistan, due to non-availability of separate data for Pakistan which is a drawback of his study. He concludes that consumption is better predicted by income related variables than habitual consumption. Khan, et al., (2015) use primary data to test the RIH with

reference to Pakistan. Their findings confirm the existence of income ratchet effect in Pakistan. However, their study has limited scope as it involves only two districts of Peshawar. The present research tries to overcome the limitations of prevailing studies by using the national level data set for Pakistan. A larger set of observations (thirty-one years) than the Akhtar's (1983) study (twenty-one year) is utilized. The present research empirically investigates the presence of all the three types of ratchet effects (consumption, income & habit) proposed by RIH. The Average Propensity to Consume (APC) and Marginal propensity to Consume (MPC) for long run and short run are also estimated by utilizing coefficients of RIH models.

3. Data and Methodology

This analysis is executed at the National level for the time periods 1986 to 2016. Per capita income and consumption are the required variables for this study. The main source for the data is World Development Indicators (The World Bank, 2018[8]). Where the consumption is proxied by per capita final consumption expenditure of household and Non-Profit Institutions Serving Households (NPISH), and income is proxied by Adjusted Net National Income. The data of consumption and income is taken at constant 2010 US dollar. To obtain the personal disposable income, direct taxes are subtracted from Adjusted Net National Income. The personal disposable income data at National level is computed on the lines proposed by (Akhtar, 1983). Data of direct taxes is collected from various Economic Surveys of Pakistan and data on population size is taken from WDI. To calculate per capita direct tax, direct taxes are divided by total population size.

The estimation techniques used in this research for time series analysis include Box-Jenkins methodology, 2SLS, GMM, and LIML. The Original Duesenberry Model and Davis Model are estimated by employing Box-Jenkins technique. In estimation of modified Davis and Duesenberry-Eckstein-Formm model by OLS, problem of endogeneity might arise as these models involve lagged dependent variable as a regressor. To address this issue the techniques 2SLS, GMM, LIML are utilized and further lags of lagged variable are employed as instruments as suggested by Reed (2015). Whereas Akhtar (1983) in his analysis used only the technique of 2SLS along with identity elements as dummy variables. To check the endogeneity in present study Durbin-Wu-Hausman test is employed. Sargan & Basmann, Stock & Yogo and Cragg & Donald tests are applied to test the instruments exogeneity and relevance, respectively. Hausman test is used to select the most appropriate method among the 2SLS, GMM, and LIML.

The various specifications of RIH model used in the present analysis are based on

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the Singh and Kumar (1971), however, slightly different forms of models are adopted as proposed by Evans (1967). The expressions for various models of RIH along with the formulae of short run marginal propensity to consume (SRMPC) and long run marginal propensity to consume (LRMPC) are cited below. The short run APC is calculated by substituting the mean values of independent variables in each model. The long run APC is equal to the long run MPC (Hadden, 1965).

1. Original Duesenberry Model: $(\frac{C}{Y})_t = \alpha + \beta(\frac{Y^0}{Y})_t$

SRMPC = α, LRMPC = $\dfrac{\alpha(1+\lambda)+\beta}{(1+\lambda)}$

2. Duesenberry-Eckstein-Formm (DEF) Model: $\left(\frac{C}{Y}\right)_t = \alpha' + \beta'\left(\frac{Y^0}{Y}\right)_t + \gamma'\left(\frac{C}{Y}\right)_{t-1}$

SRMPC = $\alpha' + \gamma'\left(\frac{C}{Y}\right)_{t-1}$, LRMPC = $\dfrac{\alpha'(1+\lambda)+\beta'}{(1+\lambda)(1-\gamma')}$

3. Davis Model: $\left(\frac{C}{Y}\right)_t = \alpha + \beta\left(\frac{C^0}{Y}\right)_t$

SRMPC = α, LRMPC = $\dfrac{\alpha(1+\lambda)+\beta}{(1+\lambda)}$

4. Modified Davis Model: $\left(\frac{C}{Y}\right)_t = \alpha' + \beta'\left(\frac{C^0}{Y}\right)_t + \gamma'\left(\frac{C}{Y}\right)_{t-1}$

SRMPC = $\alpha' + \gamma'\left(\frac{C}{Y}\right)_{t-1}$, LRMPC = $\dfrac{\alpha'(1+\lambda)+\beta'}{(1+\lambda)(1-\gamma')}$

In all above stated specifications $C_t, C_t^0, Y_t, Y_t^0, \lambda,$ and $\left(\frac{C}{Y}\right)_t$ represent per capita consumption expenditure, past peak per capita consumption expenditure, real per capita disposable income, past peak real per capita disposable income, income growth rate, and average propensity to consume in year t, respectively. In order to trace the fluctuation in $\left(\frac{C}{Y}\right)_t$, Duesenberry (1949) in his original specification uses the ratio of previous peak income to current income which is called income $\left(\frac{Y^0}{Y}\right)_t$ ratchet effect. Davis (1953) as cited in Akhtar (1983) replaces numerator by previous peak consumption i.e. $\left(\frac{C^0}{Y}\right)_t$ on the ground that standard of living is better described with actual consumption rather income variables. This effect is called consumption ratchet effect. There is a role of habits in consumption behavior as habit is the name of repetitive actions and they take time to formulate. It is termed as habit ratchet effect. To quantify this concept one period lag $\left(\frac{C}{Y}\right)_{t-1}$ is used (SIN). Hence, the significance of income ratchet effect, consumption ratchet effect and habit ratchet effect are tested by the significance of the coefficients of $\left(\frac{Y^0}{Y}\right)_t, \left(\frac{C^0}{Y}\right)_t,$ and $\left(\frac{C}{Y}\right)_{t-1}$, respectively in RIH models.

4. Empirical Analysis

Descriptive analysis of all series is presented in Table 1. The statistics depicts that there is a significant variability in the variables. Higher variability of regressors leads to

the greater precision of estimated parameters. All the variables are positively skewed except the ratio of highest income to current income (Y^0/Y) which is negatively skewed. Kurtosis values are less than three that shows that all variables have platykurtic distribution i.e., negative kurtosis (Decarlo, 1997; Doane & Seward, 2011; Scates, 1943).

Table 1: Descriptive Statistics

Variable	$(C^0/Y)_t$	$(C/Y)_t$	$(Y^0/Y)_t$	$(C/Y)_{t-1}$
Mean	0.7629	0.766	0.9522	0.7684
Median	0.7604	0.765	0.9616	0.7664
Maximum	0.8235	0.8354	1.0310	0.8354
Minimum	0.7195	0.7022	0.8192	0.7046
Std. Dev.	0.0278	0.0375	0.0589	0.0358
Skewness	0.4340	0.0943	-0.6159	0.1349
Kurtosis	2.5585	2.0720	2.3953	2.0736

Source: Authors' calculations

C_t, C_t^0, Y_t, and Y_t^0 represent per capita consumption expenditure, past peak per capita consumption expenditure, real per capita disposable income, and past peak real per capita disposable income in year t, respectively.

To avoid the spurious regression results the stationarity of variables is tested. As span of analysis comprises of thirty-one year due to distortion of small sample size property, conventional stationarity tests i.e. ADF and PP tests are not utilized in this analysis. KPSS and NG-Perron unit root tests are applied to examine the stationarity of series C/Y, Y^0/Y, C^0/Y, and C/Y_{t-1}.

In Table 2 & 3 results of KPSS and NG-Perron unit root tests are presented. Null hypothesis of KPSS states that series are stationary. As the LM statistics for all variables are lower than critical values at one percent critical value so we reject H_0 therefore it concludes that series are stationary at levels.

Results of NG-Perron unit root test are presented in Table 3. Null hypothesis of Ng-Perron states that series has unit root and if the Ng-Perron test statistics is smaller than the critical value the null hypothesis is rejected (Lopcu, Fikret, & Almila, 2013). As values of MZa, MZt, MSB and MPT for all variables are lower than their critical values at one percent level of significance hence all variables are stationary at level.

Following the lines proposed by Adefisoye (2015) the appropriate ARIMA structure for Original Duesenberry and Davis Models are selected based on the minimum values of Schwartz, Akaike, and Hannan Quin information criteria (SIC, AIC, and

Table 2: KPSS (Kwiatkowski-Phillips-Schmidt-Shin) Unit Root Test Results

Variable	LM stat.	C.V. at 1%	C.V. at 5%	C.V. at 10%	Decision
C/Y	0.0951	0.7390	0.4630	0.3470	I(0)
(C/Y)t-1	0.1108	0.7390	0.4630	0.3470	I(0)
C0/Y	0.1528	0.7390	0.4630	0.3470	I(0)
Y0/Y	0.5085	0.7390	0.4630	0.3470	I(0)

Note: C.V. stands for critical value.

$C_t, C_t^0, Y_t,$ and Y_t^0 represent per capita consumption expenditure, past peak per capita consumption expenditure, real per capita disposable income, and past peak real per capita disposable income in year t, respectively.

Table 3: Ng-Perron Unit Root Test Results

Variable	MZa	MZt	MSB	MPT	Decision
C/Y	-9.7195	-2.1053	0.2167	2.8892	I(0)
(C/Y)t-1	-8.8421	-2.0777	0.2350	2.8632	I(0)
C0/Y	-8.2504	-1.8283	0.2216	3.6789	I(0)
Y0/Y	-10.4864	-1.9777	0.1886	3.4469	I(0)
C.V. at various level of significance					
1%	-13.8	-2.58	0.174	1.78	I(0)
5%	-8.1	-1.98	0.233	3.17	I(0)
10%	-5.7	-1.62	0.275	4.45	I(0)

Source: Authors' calculations

Note: C.V. stands for critical value.

$C_t, C_t^0, Y_t,$ and Y_t^0 represent per capita consumption expenditure, past peak per capita consumption expenditure, real per capita disposable income, and past peak real per capita disposable income in year t, respectively.

HQ), high coefficient of determination (R^2), and Durbin-Watson statistics. For Original Duesenberry Consumption Model (5, 0, 1 & 5) is best fitted ARIMA model. Likewise, most appropriate ARIMA structure for Davis consumption model is (6 & 4, 0, 1 & 4), see Table 4.

DEF Model and Modified Davis Model involve lagged dependent variables as regressors. The OLS technique provides inconsistent results when it is applied to an equation that contains lagged dependent variables and correlated errors terms (Stocker, 2007). Instrumental variable (IV) techniques are used to address the problem of endogeneity in dynamic models (Bascle, 2008). Three IV techniques 2SLS, GMM,

Table 4: Estimated ARIMA Specifications Original Duesenberry Consumption Model

Model	ARIMA	SIC	AIC	HQ	R^2	DW
1	(5,0,1&5)*	-4.4347*	-4.6833*	-4.6412*	0.76*	1.45
2	(1,0,1&5)***	-4.3366***	-4.5835***	-4.5214***	0.72***	1.73
3	(1&4,0,1)**	-4.3569**	-4.6058**	-4.5572**	0.75**	2.34
	ARIMA Davis Consumption Model					
1	(1,0,4) **	-4.3069**	-4.5044**	-4.4547**	0.66**	1.39
2	(1&4,0,0)***	-3.9688***	-4.1679***	-4.1290***	0.58***	1.79
3	(6&4,0,1&4)*	-4.4031*	-4.6999*	-4.6590*	0.80*	1.47

Source: Authors' calculations

Note: *'**'*** shows the most, the less and the least accurate ARIMA models, respectively.

and LIML are applied in this study. To select most appropriate technique among 2SLS, GMM and LIML, Hausman test is applied. Based on the Hausman test results it is concluded that 2SLS and GMM techniques provides the efficient estimates for the DEF and Modified Davis Models, respectively (see Table 5).

Table 5: Hausman Test for Duesenberry-Eckstein-Formm & Modified Davis Models

Variable	Duesenberry-Eckstein-Formm Model								
	2SLS and GMM			2SLS and LIML			GMM and LIML		
	2SLS	GMM	Differ	2SLS	LIML	Differ	GMM	LIML	Differ
	(a)	(b)	(a-b)	(a)	(c)	(a-c)	(b)	(c)	(b-c)
$(C/Y_{t-1}$	0.54	0.56	-0.02	0.54	0.5	0.04	0.56	0.5	0.06
Y^0/Y	0.26	0.28	-0.02	0.26	0.26	0	0.28	0.26	0.02
Prob.χ^2			0.72			0.29			-5.44
	Modified Davis Model								
	(a)	(b)	(a-b)	(a)	(c)	(a-c)	(b)	(c)	(b-c)
$(C/Y_{t-1}$	0.32	0.32	0	0.32	0.44	-0.1	0.32	0.44	-0.12
C^0/Y	0.3	0.39	-0.09	0.29	0.30	-0.01	0.39	0.3	0.09
Prob.χ^2			0.78			0.00			-0.55

Source: Authors' calculations

C_t, C_t^0, Y_t, and Y_t^0 represent per capita consumption expenditure, past peak per capita consumption expenditure,

real per capita disposable income, and past peak real per capita disposable income in year t, respectively.

To test the endogeneity of lagged dependent variable $(C/Y)_{t-1}$ in DEF and Modified Davis models Durbin-Wu-Hausman test is employed. The hypothesis of no endogeneity is rejected at one percent level of significance for both models, which concludes that lag of dependent variable is endogenous in both cases (see Table 6). Instruments' exogeneity for DEF and Modified Davis Consumption Model is tested by Basmann & Sargan tests. Null hypothesis is accepted as p-value is greater than one percent for both models. It may be concluded that in these models, instruments are uncorrelated with error terms. These statistics also indicate that instruments are valid and structural models are specified correctly (see Table 6). In this study the selected technique is 2SLS for DEF model estimation.

Table 6: Tests Results for Lagged Dependent Variable's Endogeneity, Exogeneity and Week Instruments

Duesenberry-Eckstein-Formm Model					
Endogeneity	Durbin-Wu-Hausman	23.8816***			
	test statistic				
Exogeneity	Basmann test statistic	1.1639			
	Sargan test statistic	1.4352			
Weak Instruments	Stock & Yogo Test	Variable	$F_{(2, 11)}$	R2	Adjusted R2
		$(C/Y)t\text{-}1$	19.545***	0.5369	0.4106
Modified Davis Model					
Endogeneity	Durbin-Wu-Hausman	38.7335***			
	test statistic				
Exogeneity	Basmann test statistic	2.1023			
	Sargan test statistic	2.6449			
Weak Instruments	First Stage Regression	Variable	$F_{(2, 13)}$	R2	Adjusted R2
	Summary	$(C/Y)t\text{-}1$	12.803***	0.5571	0.4549

Source: Authors' calculations

Note: *** represents the level of significance at 1% .

C_t, and Y_t represent per capita consumption expenditure, real per capita disposable income in year t, respectively.

Hence, to check the null hypothesis of weak instruments the Stock & Yogo test is utilized. The test's result shows high R^2 and F statistic greater than threshold of ten. These findings lead to the rejection of weak instruments hypothesis (see Table 6). The Prob > F shows that additional instruments have explanatory power for $(C/Y)_{t-1}$ after controlling the effect of $(Y^0/Y)_t$. It may also be concluded that 2SLS is reliable estimation technique in this case. Stock & Yogo test is not applicable on GMM estimated models so in order to check the relevance of instruments in case of GMM estimated Modified Davis Model (with one endogenous variable), first stage regression summary is used. According to the rule of thumb instruments are not weak as F-statistics is significantly greater than ten (see Table 6).

Diagnostic analysis has been executed on selected models for four versions of RIH. All estimated models satisfy the assumptions of normality, no auto correlation, no heteroscedasticity, and no multicollinearity. In order to test the normality in models two types of test i.e. Jarque-Bera and Shapiro-Wilk tests are used. The null hypothesis of non-normal distributions is rejected if the p-values of the test are less than their given level of significance. The results depicted in Table 7 declare that residuals are normally distributed for all the estimated models at one percent level of significance. Heteroscedasticity test is used to check whether the variance among the error terms is equally distributed or not. White and Breusch-Pagan tests are used. The null hypothesis of homoscedasticity in both White and Breusch-Pagan could not be rejected even at one percent level of significance, see Table 7. Breusch- Godfrey test is used to check the autocorrelation. Null hypothesis says that there is no serial correlation in error terms. The finds given in Table 7 that null hypothesis of no serial could not be rejected. The VIF (Variance Inflation Factor) and TOL (Tolerance) tests are used to check linear relationship among regressors. The results Table 8 show that VIF value is less than ten and TOL value is close to one it indicates that there is no serious multicollinearity problem in any of the estimated models.

The estimation results for the four specifications of RIH are presented in Table 9. It may be asserted based on the empirical findings of this study that RIH prevails in case of Pakistan. It is demonstrated that all three kinds of ratchet effects, income, consumption, and habit significantly affect household's decision-making process. Based on the overall significance level, the significance and standard errors of estimated coefficients, and diagnostic statistics the Davis model is the best fit among four estimated models followed by Original Duesenberry model.

The Original Duesenberry Model shows that income ratchet effect $(Y^0/Y)_t$ with a positive sign is highly significant. It depicts that one percent increase in Y^0/Y leads to increase in the current consumption permitted by current income $(C/Y)_t$ by 0.32 percent. In DEF model the magnitude of income ratchet effect is substantially low

Table 7: Diagnostic Tests

Model	Normality Test		Heteroskedasticity Test		Autocorrelation Test	
	Jarque-Be-ra	Shap-iro-Wilk	White	Breusch-Pa-gan	Durbin-Wat-son	Breus-ch-Godfrey
$\left(\dfrac{C}{Y}\right)_t = \alpha\ +\ \beta\ \left(\dfrac{Y^0}{Y}\right)_t$	1.0020	0.9500	0.8816	3.3986*	1.4506	5.6139*
$\left(\dfrac{C}{Y}\right)_t = \alpha' + \beta'\left(\dfrac{Y^0}{Y}\right)_t + \gamma'\left(\dfrac{C}{Y}\right)_{t-1}$	0.0453	0.9837	0.635	0.786		5.2592*
$\left(\dfrac{C}{Y}\right)_t = \alpha\ +\ \beta\left(\dfrac{C^0}{Y}\right)_t$	0.1999	0.9728	5.7658	0.0492	1.4709	9.9309**
$\left(\dfrac{C}{Y}\right)_t = \alpha' + \beta'\left(\dfrac{C^0}{Y}\right)_t + \gamma'\left(\dfrac{C}{Y}\right)_{t-1}$	1.075	0.9602	7.095*	3.489		6.1540***

Source: Authors' calculations

Note: ***'**'* represents the significance at 1%, 5% , and 10% levels.

$C_t, C_t^0, Y_t,$ and Y_t^0 represent per capita consumption expenditure, past peak per capita consumption expenditure, real per capita disposable income, and past peak real per capita disposable income in year t, respectively.

For Duesenberry-Eckstein-Form Model			
Method	Variable	$\left(\dfrac{Y^0}{Y}\right)_t$	$\left(\dfrac{C}{Y}\right)_{t-1}$
	VIF	1.04	1.04
	TOL	0.96	0.96
For Modified Davis Model			
		$\left(\dfrac{C^0}{Y}\right)_t$	$\left(\dfrac{C}{Y}\right)_{t-1}$
	VIF	1.12	1.12
	TOL	0.89	0.89

Source: Authors' calculations

Note: ***'**'* represents the significance at 1%, 5% , and 10% levels.

$C_t, C_t^0, Y_t,$ and Y_t^0 represent per capita consumption expenditure, past peak per capita consumption expenditure, real per capita disposable income, and past peak real per capita disposable income in year t, respectively.

as compared to habit ratchet effect $(C/Y)_{t-1}$. However, both kinds of ratchet effects are highly significant. Estimates of Davis model state that current consumption permitted by current income increases by 0.14 percent due to one percent increase in consumption ratchet effect $(C^0/Y)_t$. It also shows that consumption ratchet effect is significance. Forth model i.e., modified Davis consumption model shows that the

effect of peak consumption is larger than that of habit persistence effect. It depicts that one percent increase in $(C^0/Y)_t$ leads to increase the $(C/Y)_t$ by 0.44 percent, whereas $(C/Y)_{t-1}$ increases the current consumption permitted by current income by 0.35 percent. Both effects are fairly significant in this model. The findings that $(C^0/Y)_t$ and $(C/Y)_{t-1}$ have significant effect on current consumption behavior deviates from Akhtar (1983). The significance of $(C/Y)_{t-1}$ refers to the fact that current C/Y is affected by habit persistence and it is desired C/Y not actual C/Y that is affected by previous peak income and consumption relative to that permitted by current income (SIN).

Table 9: Estimation Results for the Four Specifications of Relative Income Hypothesis

| Model	$\hat{\alpha}$	$\hat{\beta}$	$\hat{\gamma}$	D-W	R^2	SRMPC	LRMPC
$\left(\dfrac{C}{Y}\right)_t = \alpha + \beta\left(\dfrac{Y^0}{Y}\right)_t$	0.4680***	0.3171***		1.45	0.76	0.4680	0.7800
	(0.0859)	(0.0909)					
$\left(\dfrac{C}{Y}\right)_t = \alpha' + \beta'\left(\dfrac{Y^0}{Y}\right)_t + \gamma'\left(\dfrac{C}{Y}\right)_{t-1}$	0.1014	0.2653***	0.5435***	____	0.59	0.5175	0.7926
	(0.0773)	(0.0743)	(0.0764)				
$\left(\dfrac{C}{Y}\right)_t = \alpha + \beta\left(\dfrac{C^0}{Y}\right)_t$	0.6615***	0.1423***	____	1.47	0.81	0.6615	0.8013
	(0.0357)	(0.0464)					
$\alpha' + \beta'\left(\dfrac{C^0}{Y}\right)_t + \gamma'\left(\dfrac{C}{Y}\right)_{t-1}$	0.1606	0.4409*	0.3534*	____	0.35	0.4312	0.9178
	(0.1285)	(0.2399)	(0.2036)				

Note: ***'**'* represents the significance at 1%, 5% , and 10% levels.

Source: Authors calculations

The regression results demonstrate that habit ratchet effect is stronger than peak income effect in DEF model, whereas the peak consumption is more powerful than habit ratchet effect in Modified Davis Model. It reflects that people consider peak consumption more than their intermediate period consumption level in making their current consumption decision-making process. In the case of DEF & Modified Davis Model habit persistent effect increases the magnitude of APC. The $\hat{\gamma}$ (equals to is $(1-\gamma)$ adjustment coefficient that indicates the change in C/Y during one year to next equals to the proportion of the difference between desired and last year's actual C/Y. It measures the speed of adjustment between the desired and actual consumption. The value of adjustment coefficient ranges between zero to one. Coefficient value near to one means adjustment process is fast and opposite holds for value close to zero (Chembezi & Womack, 1987). The estimated values of coefficient of adjustment reveal that forty-five percent and sixty-five percent of discrepancy will be eliminated in a year according to the DEF and Modified Davis models, respectively. Adjustment coefficient shows that Pakistan's households rapidly fill the gap between desired and

actual consumption permitted by current income.

For all estimated RIH models, average propensity to consume and save (APC & APS) in the short run are portrayed in Figure 1. The findings demonstrate that according to all the four models of RIH a Pakistani household on average spends around seventy-seven percent of their current disposable income. The short run and long run MPC calculated from the four estimated models are depicted in figure 2. The short run and long run MPCs range from 0.43 to 0.66 and from 0.78 to 0.92, respectively.
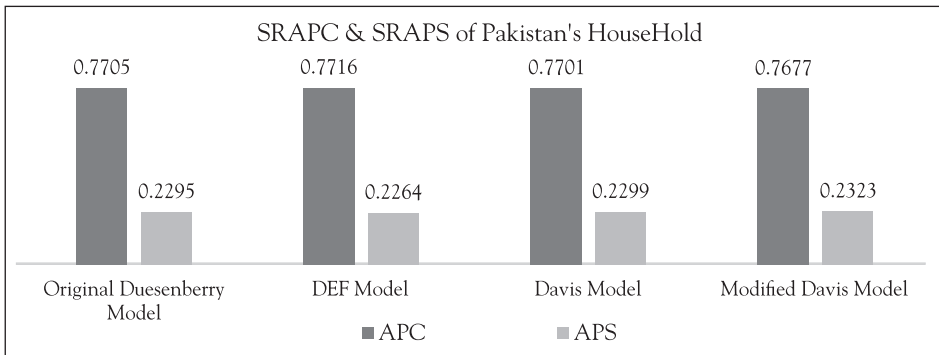
Source: Authors' calculations

Figure 1: Estimated SRAPC and SRAPS for Pakistan's Household
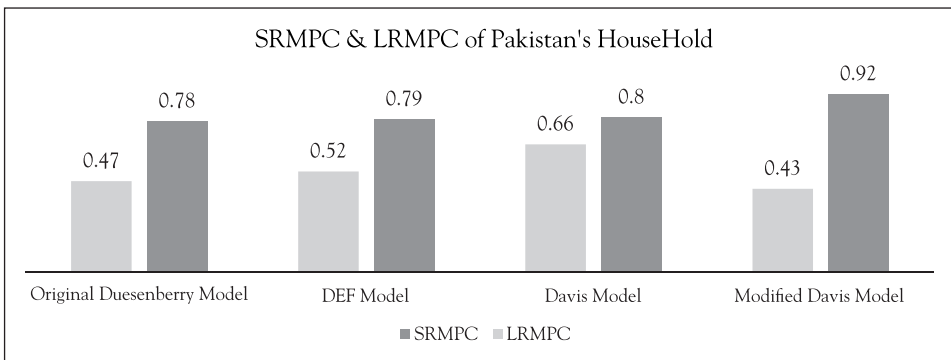
Source: Authors' calculations

Figure 2: Estimated Short run and Long run MPCs for Pakistan's Household

It is demonstrated that in short run the MPC is less than the APC and the short run MPC is less than the long run MPC in all specifications of RIH. These findings are in accordance with the Keynesian's propositions about consumption function (Keynes, 1936).

Moreover, it implies that in response to the changes in income Pakistan's house-

holds adjust their consumption more in the long run than in the short run. The myopic consumer behavior and liquidity constraints commonly observed in developing countries could be the reasons for these outcomes of the present study (Khan, Chen, Memon, & Ahmed, 2014; Shaikh, Ismail, Ismail, Shahimi, & Shafiai, 2018).

5. Conclusion and Policy Recommendations

The present research analyzes the consumption behavior in Pakistan by incorporating social aspects in consumption-income model as proposed by various versions of RIH. The findings of this study witness the significant presence of all the three kinds of ratchet effect in case of Pakistan. In Duesenberry-Eckstein-Formm (DEF) model, habit ratchet effect is found to be stronger than income ratchet effect. Whereas in modified Davis model consumption ratchet effect exceeds the habit ratchet effect. These results indicate the prevalence of irreversible consumption behavior in response to change in income. It is observed that long run marginal propensities to consume are closer to one which demonstrates smooth consumption behavior over long period in Pakistan. The estimated short run marginal propensities to consume are observed to be less than long run marginal propensities to consume. It demonstrates that long run response of consumption to a given change in income is greater than its short run response. These findings are in accordance with the existing consumption theory. The estimated short run and long run propensities to consume provides an empirical evidence for high consumption and low saving tendencies in Pakistan.

According to the present analysis consumers try to maintain the highest standard of living enjoyed in the past. In this process households do not retain balance between savings and consumption. Keeping in view the vital role of balance between consumption and saving in the economy and the findings of present study it is recommended to control the excessive consumption behavior. To achieve this end Policy makers must choose the appropriate tools of fiscal, monetary, and commercial polices that may include progressive taxation, import restrictions, attractive savings schemes, and incentives for investment.

It is indicated in the existing literature that in attempt to increase consumption level households induce to overwork. This effect increases working hours per worker that ultimately leads to increase in labour supply and wage reduction. As suggested by Palley (2008) to minimize the expected negative effects of over working induced by conspicuous consumption it is suggested to impose labour market ceiling.

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