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The Estimation of Aggregate Consumption Function for High Income Countries

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ABSTRACT

Aggregate Real Private Consumption (ARPC) is one of the major components of the Gross Domestic Product (GDP)that contributes to specify any economy's long term living standards. The contribution of ARPC stands on an average around 55%. It is therefore important to understand the components of the consumption which is almost more than half of the aggregate economic expenditure. The study is an attempt to make a case for developing countries to bring policy level changes in order to determine the consumption pattern of developing countries' GDP. Using appropriate empirical model the study investigates the validity of Permanent Income Hypothesis (PIH) and Absolute Income Hypothesis (AIH)on ARPC for selected developed economies. The results of the study reveals that the important determinants of ARPC in the long-run are real GDP and wealth, while in the short-run they are real interest rate and unemployment rate.

Keywords:*Aggregate Real Private Consumption, Gross Domestic Product, Absolute Income Hypothesis, Permanent Income Hypothesis*

JEL Classification:*E21, E1, E25*

1. INTRODUCTION

In order to better understand the concepts of macroeconomics, it is important to comprehend the Aggregate Real Private Consumption (ARPC). Understanding the ARPCnotonly helps to understand the basics of economics but it also provides a command over macroeconomic agents, like saving, investment, aggregate demand and expenditure. Actually, these all bring in the perspectives of the role of business cycle in an economy. The ARPC consists half of aggregate economic expenditure and also half of the GDP, which makes its role important and indeed very interesting to determine the economy's standard of living. Therefore, it is highly important and recommended by policy makers and academicians to estimate the ARPC function of an economy for better understanding and policy making initiatives.

Globally, economies have realized the importance of ARPC due its large contribution over half of economy's aggregate expenditure. Consequently it becomes the major component of aggregate demand in High Income Countries (HIC). TheARPC is animportant factor for decision makers to accelerate aggregate economic activities. Specifically, during the recession part of the economy's business cycle plays a crucial role to boost the economy. On the other hand, the same has been controlled during the growth period to control the aggregate economic activities and to sustain a steady growth pace.

Since 19th century, several theories have been established to understand the concept and behaviour of ARPC. These theories have been introduced by prominent economists and social theorists for better understating and explanation of households' consumption behaviour. The evolution process of consumption theories was started in 1936 after the "Great Depression".J.M. Keynes was the first economist to introduce the concept of consumption function namely 'psychological law of consumption'. The psychological law of consumption also became popular as Absolute Income Hypothesis (AIH).

The study is an attempt to understand the important concepts and theories of consumption function in determining an economy's long term living standards. The study applies empirical model to assess the role and determinants of theARPC in developed economies. Following the completion of this introduction section, the second section explains in details the concepts of consumption functions. It also determines the empirical findings on the subject of current research study. The third section presents the methodology, which explains the methodology adopted, model and variables, and the data and their sources. Fourth section provides the empirical results with detail discussion and concluding remarks.

2. LITERATURE REVIEW

2.1. Theoretical Underpinning

The phrase'consumption function' is the relationship between consumption and disposable income and has along standing and in existing literature. At very firstJ.M. Keynes introduced this concept in his book "The General Theory of Employment, Interest and Money". He dealt with the phenomenon of consumption function with a common sense and put forth it in the shape of "psychological law of consumption". As stated, fundamentally the psychological law of consumption relies predominately on common sense of human nature. However, there is no such rational-choice theory or empirical support to this argument. Further, the law of utility maximization and its coreconcept was ignored altogether.

According to Keynes a current disposable income of a household is the key determinant of its current consumption. Mathematicallythe consumption function has linear characteristics and the slope isdescribed as the Marginal Propensity to Consume (MPC). The MPC is considered constant and itsvalue lies between zero and one. Whereas the Average Propensity to Consume (APC) means the fraction of income devoted to consumption. Keynes's consumption function states that with every increase of income, APC will tend to decrease.

Following the Keynes theoretical underpinning on consumption function, Simon Kuznets (Nobel Laureate)pointed out a paradox. Simon who streamlines the measure of National Income Accounts tested the theory empirically using US data. He showed that in the long run APC of consumption function remains constant (called Kuznet's paradox).However, in the short-run the results were consistent with Keynes's consumption function. The paradox pointed out in the long-run was later termed as 'Kuznet's paradox'.

Later on an argument was built up in response toKuznet'sparadox by Duesenberry in 1948 and termed as Relative Income Hypothesis (RIH). Duesenberry (1984) argued that the consumption of household depends on its own current income and relative income of the society. Thus, when the current income of a household falls, he/she still follows his/her past peak level of consumption. He continues consuming a large portion of his income to maintain his past consumption pattern and vice versa. The RIH states that the household's consumption depends on relative income (income of other households in surrounding) and past peak of income, both in the short-run and in the long-run.

Duesenberry further argues that two families with the same level of income but living in different surroundings consume differently. The time series dimension of the RIH is almost parallel to the cross-sectional aspect of the RIH. In cross-section, a household compares his level of income with other households within groups; while in time series analysis the present level of income with the past peak of income that is achieved in the near past. Thus, when the household current level of income is greater than his past peak level of income, he would consume more. This phenomenon is called "*Ratchet Effect"*.

Despite the acceptance of RIH intervention across the board, theories continued to add in the post-1950 period. Modigliani *et al*., (1954) introduced the concept of Life Cycle Hypothesis (LCH). Modigliani's model explains that how households smooth their consumption in different phases of life through saving. Implicitly, the LCH gives the idea of lifetime budget constraint to maximize the consumption utility during the lifetime. Thus, according to the LCH the income stream of households are relatively low at the beginning and after retirement. However, the households have a strong income stream in the middle age or working age.LCH is consistent with cross-section analysis of Kuznets when income rise APC goes to fall, which further implies that MPC< APC. Furthermore, the LCH also explains that how APC remains constant in the long run.

In 1957 the concept of permanent income hypothesis (PIH) was introduced by Milton Friedman. Milton developed the concept of permanent income that how consumption of a household is determined by the current income as well as expected income in coming time/period.

2.2. Empirical Underpinning

Several empirical studies were found on testing the concept of consumption function. However, there are limited studies on the deterministic role of ARPC in developed economies. Following are some empirical findings using the concept of consumption function:

Elwood (1997) estimated the permanent and transitory components of GDP by using the consumption theories to highlight that the households discriminate between the anticipated and unanticipated change in the GDP as well as transitory and permanent components of the GDP. The result indicates that there is excess sensitive attachment of consumption with the income.

Heymann and Sanguinetti (1998) stressed on the behaviour of wealth perception on consumption. They argued that consumption decisions of households are based on future expectations about supply of credit, production and performance of the economy. Thus, a positive expectation increases households' consumption. However, they argued that it is hard to take the decision about the households' consumption when the economy experiences political and economic reforms.

Harris (1999) investigated the determinants of Australian saving by using the data of household saving survey. The study applied the probit model and found that current income is the most important determinates of saving. Moreover, in this regard the demographics situation is also very important.

Ahumada and Garegnani (2000) estimated the aggregate dynamic consumption for Argentina by introducing the exchange rate and past peak of income as a proxy of wealth. They stated that thereis only one determinant of ARPC, i.e. households' disposable income in the long-run.

Singh (2004) investigated the determinants of ARPC in the case of Fiji. The study used annual data from 1979 to 2001 by applying the error correction models (ECM). The result of the study suggests that the ARPC of Fiji converges from disequilibrium to equilibrium in a robust manner. Moreover, in short-run wealth, income and real interest rate affect the ARPC of Fiji. However, in the long-run income and wealth, affect the ARPC.

Joseph *et al*. (2006) used the time series data for 11 West German states to test PIH for these states to investigate the stochastic relationships between consumption and expected income. The empirical results of the study do not support the PIH due to a weak relationship between consumption and innovation in income. However, for each state of Germany and as a whole for Germany, the relationship between consumption and innovation in income is asymmetric. This indicates the liquidity constraints being faced by the households in Germany.

Castro (2006) examined the relationship between consumption and disposable income by using the annual data of Portugal. The result of the study suggested that the high response of consumption to disposable income is due to the existence of liquidity constraints. Moreover, the study concluded that due to the high-interest rate or the unemployment rate, the liquidity constraints received a big portion of disposable income.

Manitsaris (2006) used the annual data from 1980 to 2005 for 15 European countries and estimated the consumption function for these countries under the PIH. The study used the combined partial adjustment and adaptive expectations model, the results of the study found consumption under PIH consistent with the data in all 15 European countries.

Kandil andMiezaie (2007) examined the determinants of ARPC in developing countries. They used income, the exchange rate as a proxy for cost of consumption as anexogenous variable in their model. The expected changes in these variables boost ARPC while the unexpected changes determine the random transitory adjustment in consumption. Mostly a change in ARPC come from an unexpected change in income, however, exchange rate fluctuation hasmixed effect on aggregate private consumption. Moreover,

sometimes domestic policy like fiscal policy has a negative effect on ARPC. Similarly, monetary growth boosts ARPC. The very recent evidence reveals that the decrease of the size of government and expansion of monetary policy stimulate ARPC in developing countries.

Shivani andWilbratte (2009) implied a new approach i.e. multivariate stochastic de-trending approach introduced by Vahid and Engle (1997), and tested PIH for five major industrial countries (Canada, France, Italy, the UK, and the USA). The results of the study supported the PIH concept of consumption for Canada, France, Italy, the UK, and the USA.

Horipka (2013) examined the recent trends of ARPC for G7 countries[1] for the period of 2002-2007 with a special focus on Japan. Moreover, he also investigated the determinants of ARPC in the case of G7 countries. The study highlights that the main determinants of ARPC are households' income, saving, GDP, wealth and employment condition. The study shows that during 2002-2007 the Japan's ARPC remained relatively stagnant as compared to the other G7 countries. He argued that the stagnation in Japan's aggregate private consumption is due to the stability in households' saving and stagnation in household wealth and income.

3. METHODOLOGICAL FRAMEWORK& EMPIRICAL MODEL

3.1. Data and Sources

This paper is an effort to extend the existing scarce literature. Therefore, four high income countries as per the list of HIC by World Bank (2014) are randomly selected for this study. Thus, four developed countries including Australia, Korea, New Zealand and Singapore were selected for the empirical analysis (see table 1 for selected countries characteristics). The period covered in the empirical analysis is from 1971 to 2013. The data taken is real GDP, ARPC, quasi-money, discount rate and unemployment rate.The sources of the data and expected signs of the variables are reported in table 2.

Table.1: High Income Countries (HIC)

Countries	Income Level	Data Quality	Stage
Australia	HIC	A	Developed
Korea	HIC	A	Developed
New Zealand	HIC	A	Developed
Singapore	HIC	A	Developed

Source: World Bank (WB) report 2013

[1]Canada, France, Germany, Japan, Italy, UK, and USA. Note CONS

Table.2: Expected Signs and Data Sources of the Variables:

Variable	Expected Sign	Data Source
CON	Dependent Variable	IFS (2013)
GDP	Positive	IFS (2013)
QM	Positive	WDI (2013)
RIR	Negative/ Positive	IFS (2013)
UR	Negative	IFS (2013)

Note: (CON) ARPC, (GDP) gross domestic product, (QM) quasi money,

(RIR) real interest rate, (UR) unemployment rate

3.2. ARDL Approach to Co-integration

According to AIH and PIH, the households' consumption is the function of real disposable income and future expected income (wealth) of households. Therefore, on the basis of AIH and PIH the simplest form of consumption function is as under:

$$CONS_t = f(Y_t, W_t) \tag{1}$$

Where:

$(CONS_t)$ = ARPC

(Y_t) = Households' disposable income

W = Households' wealth

The above mentioned consumption function represents the long run consumption function of households, despite the fact that a number of empirical studies and alternative theories of consumption hypotheses suggested additional determinants for ARPC such as real interest rate and income uncertainty. Thus, the absolute functional form of the households' ARPC which include both short run and long run determinants of ARPC is as under:

$$CONS_t = f(Y_t, W_t, R_t, UR_t) \tag{2}$$

Where: (R_t) is real interest rate and (UR_t) is unemployment rate. We applied log-linear to equation (2) to get efficient empirical results from estimation of equation (3). The log-linear formulation of ARPC model becomes as:

$$\ln CONS_t = \alpha_0 + \alpha_Y \ln Y_t + \alpha_W \ln W_t + \alpha_R \ln R_t + \alpha_{UR} \ln UR_t + \mu_i \tag{3}$$

Where: (ln) is the natural log of respective variable and μ is random error with constant variance and zero mean. The ARDL form of equation (3) is:

$$\Delta \ln C_t = \beta_0 + \sum_{i=0}^{j} \beta_{1i} \Delta \ln Y_{t-i} + \sum_{i=0}^{j} \beta_{2i} \Delta \ln W_{t-i} + \sum_{i=0}^{j} \beta_{3i} \Delta \ln C_{t-i} + \sum_{i=0}^{j} \beta_{4i} \Delta \ln r_{t-i} +$$

$$\sum_{i=0}^{j} \beta_{5i} \Delta \ln UR_{t-i} + \alpha_Y \ln Y_{t-1} + \alpha_W \ln W_{t-1} + \alpha_C \ln C_{t-1} + \alpha_R \ln R_{t-1} + \alpha_{UR} \ln UR_{t-1} + u_t \quad (5)$$

Where: β_i has short run information while $\alpha_Y, \alpha_W, \alpha_C, \alpha_{UR}$ have long run information. Thus, null and alternative hypotheses for co-integration are:

$$H_0 = \alpha_Y = \alpha_W = \alpha_C = \alpha_R = \alpha_{UR} = 0$$

$$H_1 \neq \alpha_Y \neq \alpha_W \neq \alpha_C \neq \alpha_R \neq \alpha_{UR} \neq 0$$

We used bounds test of Pesaran*et al*., (2001) to test the null and alternative hypotheses of co-integration, once we reject the null hypothesis then in the next step we estimate the ARDL model to derive the short and long run coefficients and Error Correction Term (ECT), which shows the speed of adjustments from disequilibrium to equilibrium.

3.3. Unit Root Tests

Before apply any econometric techniques, first we test the data of the variables for unit root. The most popular unit root tests are ADF and PP test. Therefore, we also apply these two tests for testing the data for unit root.

Table 3: Results of ADF test at level

Country	CON		GDP		QM		RIR		UR	
	c,0	c,t	c,0	c,t	c,0	c,t	c,0	c,t	c,0	c,t
Australia	*-3.4***	*-3.72***	*-3.46***	*-3.72***	*-3.54***	*-3.57***	---	---	*-3.29***	*-3.23***
Korea	*-3.06**	*-4.05***	---	----	----	----	---	---	----	----
New Zealand	*-2.92**	*-2.84*	*-3.97***	*-3.61***	*-4.92***	*-4.82****	---	---	---	---
Singapore	---	---	*-4.79****	*-6.92****	*-4.08***	*-3.80****	*-5.9****	*-5.8****	*-5.86****	*-6.18***

Note: ***p<0.01, **p<0.05, * p<0.10

Table 4: Results of ADF test at First Difference

Country	CON		GDP		QM		RIR		UR	
	c,0	*c,t*	*c,0*	*c,t*	*c,0*	*c,t*	*c,0*	*c,t*	*c,0*	*c,t*
Australia	*-3.46***	*-3.72***	*-3.46***	*-3.72***	*-3.54***	*-3.57***	---	---	*-3.29***	*-3.23***
Korea	*-4.87***	*-4.36***	---	---	---	---	---	---	---	---
New Zealand	*-2.92**	*-2.84*	*-3.97***	*-3.61***	*-4.92***	*-4.82****	---	---	---	---
Singapore	---	---	*-4.79****	*-6.92****	*-4.08***	*-3.80****	*-5.9****	*-5.8****	*-5.86****	*-6.18***

Table.5: Results of PP Test at Level

Country	CON		GDP		QM		RIR		UR	
	C,0	*c,t*	*c*	*c,t*	*C*	*c,t*	*c*	*c,t*	*c*	*c,t*
Australia	*1.01*	*-2.44*	*1.88*	*-2.07*	*0.55*	*-1.48*	*-1.33*	*-2.77*	*-1.15*	*-1.80*
Korea	*-0.86*	*-1.89*	*-0.24*	*-3.12*	*-0.71*	*-2.17*	*-4.62****	*-7.03****	*-2.43*	*-2.48*
NewZealand	*-0.25*	*-1.89*	*-0.89*	*-1.37*	*-0.55*	*-1.97*	*-1.47*	*-4.4****	*-1.89*	*-2.05*
Singapore	*1.93*	*-3.31**	*2.90*	*-1.07*	*0.80*	*-2.11*	*-1.68*	*-2.68*	*-2.03*	*-2.11*

Note: ***p<0.01, **p<0.05, * p<0.10

Table.6: Results of PP test at First Difference

Country	Δ CON		Δ GDP		Δ QM		Δ RIR		Δ UR	
	C	*c,t*	*c*	*c,t*	*c*	*c,t*	*c*	*c,t*	*c*	*c,t*
Australia	*-4.14***	*-4.22***	*-3.49***	*-3.72***	*-3.53***	*-5.51***	*-5.30***	*-5.18***	*-3.13**	*-3.05*
Korea	*-5.02****	*-5.28****	*-8.07****	*-7.62****	*-2.59**	*-2.48*	---	---	*-4.57***	*-4.44****
NewZealand	*-2.88**	*-2.79*	*-3.63***	*-3.68***	*-4.92***	*-4.82****	---	---	*-2.78**	*-2.75*
Singapore	---	---	*-4.79****	*-4.99****	*-4.03***	*-4.03***	*-6.21***	*-6.21***	*-5.67****	*-5.99****

Note: ***p<0.01, **p<0.05, * p<0.10

Table 7below summarizes the results of tables 2, 3, 4, and 5 respectively; which clearly show that all of the variables neither integrated at level nor at first difference but mixed of both. Therefore, in a given situation the best econometric technique is ARDL, which is easily applicable to the data and will give us the best results to estimate the dynamic of short and long run relationship.

Table.7: Order of Integration

Country	Australia		Korea		New Zealand		Singapore	
Test	*ADF*	*PP*	*ADF*	*PP*	*ADF*	*PP*	*ADF*	*PP*
Con	*I(1)*	*I(1)*	*I(1)*	*I(1)*	*I(1)*	*I(1)*	*I(0)*	*I(0)*
GDP	*I(1)*	*I(1)*	*I(0)*	*I(1)*	*I(1)*	*I(1)*	*I(1)*	*I(1)*
W	*I(1)*	*I(1)*	*I(0)*	*I(1)*	*I(1)*	*I(1)*	*I(1)*	*I(1)*
R	*I(0)*	*I(1)*	*I(0)*	*I(0)*	*I(1)*	*I(1)*	*I(1)*	*I(1)*
UR	*I(1)*	*I(1)*	*I(0)*	*I(1)*	*I(1)*	*I(1)*	*I(1)*	*I(1)*

The results of the diagnostic tests revealed that our estimated model is free from respective econometric problems. Furthermore, we applied cumulative sum (CUSUM) and cumulative sum of squares (CUSUMsq) to test the stability of the coefficients of our estimated model. The figures of CUSUM and CUSUMsq for Australia (Figure 1), Korea (Figure 2), New Zealand (Figure 3) and Singapore (Figure 4)are available in Appendix.

4. DESCRIPTIVE RESULTS AND ANALYSIS

Before apply any econometric technique first we are interested to estimate the Average Propensity to Consume (APC) and its mean and standard deviation of Australia, Korea, New Zealand and Singapore, to examine the pattern of APCs, would give us very important information about the role of current income and will give rough idea about the validity of PIH, AIH and main determinates of ARPC.

Table 8 reported the year wise APC from 1985 to 2013 for Australia, Korea, New Zealand, and Singapore. The low standard deviation of APC indicates that permanent income plays an important role in making households consumption choices.However, high standard deviation shows that current income of households has an important determinant of ARPC. Thus, on average the standard deviation of APCs of Australia, Korea, New Zealand, and Singapore are low. Therefore, it provides a plausible insight on application of PIH might be valid for Australia, Korea, New Zealand and Singapore.

Overall, the APC values of Australia shows a downward trend.In 1970 the APC is a little high and then

starts decreasing continuously till 2013 as shown in the table 3. The APC values are high for the earlier period, then decrease persistently and reach to 0.55 in 2013.This phenomenon is very similar to AIH that with increase of income over the period, APC will tend to fall. Moreover, the standard deviation of APCs is 0.011 which is quite low, shows stability in ARPC. Similarly, the APCs of New Zealand are also showing downward trend and decreasing consistently with increase of real GDP as postulated by AIH. The average value of New Zealand's APCs is 0.519 while standard deviation is 0.0322. The standard deviation of New Zealand's APCs is also small and shows consistent pattern of ARPC. However, the standard deviation of the New Zealand is little high than the standard deviation of Australian, which revealed that consumption pattern of Australia, is stronger than New Zealand.

The values of APC obtained for Korea in general shows a downward trend.First it tends to fall and then exhibits an upward trend from 1991 to 2003, while after 2003, APCs fall again. However, the general trend of the APCs is decreasing, which is compatible with AIH. The mean value of Korean's APCs is 0.51 while standard deviation is 0.03, which is smaller than the mean values of Australia and New Zealand.However, the standard deviation is greater than Australia and New Zealand which shows that the APCs of Korea are more volatile than APC of Australia and New Zealand.

Table 8: APCs' of Australia, Korea, New Zealand and Singapore (1985-2013)

Year	*Australia*	*Korea*	*New Zealand*	*Singapore*
1985	*0.605553*	*0.504825*	*0.685836*	*0.424000*
1990	*0.581573*	*0.476445*	*0.617375*	*0.47402*
1995	*0.579051*	*0.539729*	*0.586272*	*0.433270*
2000	*0.574585*	*0.560408*	*0.591197*	*0.426029*
2005	*0.567615*	*0.537919*	*0.594723*	*0.401307*
2010	*0.573796*	*0.509242*	*0.599237*	*0.366686*
2013	*0.557627*	*0.510192*	*0.589477*	*0.339129*
Mean	*0.578745*	*0.519353*	*0.602924*	*0.424131*
Maximum	*0.605553*	*0.581924*	*0.685836*	*0.482336*
Minimum	*0.557627*	*0.450219*	*0.578461*	*0.339129*
S.D	*0.011395*	*0.032230*	*0.024138*	*0.039961*
JB	*3.873239*	*0.465351*	*62.22117*	*1.597104*
Prob:	*0.144191*	*0.792411*	*0.000000*	*0.449980*

Note: *Complete table is provided in Annexure (see Annex 1)*

In similar manner like Australia, New Zealand and Korea, the APCs attained for Singapore also show a downward trend with increase of real GDP over the period. However, the Singapore's average value of APCs is 0.43, which is very smaller than Australia, New Zealand and Korea, although, the values of APC are between zero and one as postulated by consumption hypotheses. Moreover, the downward trend of APC is also compatible with AIH. The standard deviation of Singapore's APCs is 0.39 which is higher than Australia, New Zealand and Korea. Therefore, as compare to these countries the ARPC of Singapore posits some volatility, however, the standard deviation of Singapore's APCs is not so high and comparatively higher than Australia, New Zealand and Korea.

5. EMPIRICAL RESULTS AND ANALYSIS

5.1. Long-Run Results of ARDL

The long run coefficients for Australia, Korea, New Zealand and Singapore, show that MPC out of real GDP and MPC out of wealth are statistically significant at different critical levels and having correct signs as postulated by AIH and PIH (see Table 9 below). The values of MPC out of real GDP for Australia, Korea, New Zealand and Singapore are; 0.579, 0.640, 0.657 and 0.629 respectively, which indicate that a 1 % increase in real GDP leads to augment ARPC by 0.579%, 0.640%, 0.657% and 0.629% respectively. Similarly, the values of MPC out of wealth for Australia, New Zealand, Korea and Singapore are; 0.288, 0.334, 0.286 and 0.223 respectively, which demonstrate that a 1% increase in wealth leads to boost the ARPC of respective countries by 0.288%, 0.334%, 0.286% and 0.223% respectively. However, the real interest rate shows mixed effect on ARPC, in the case of New Zealand and Korea it appears with negative sign, supporting the substitution effect while for Australia and Singapore its appears with positive sign, supporting the income effect. In case of Australia and New Zealand the coefficients of real interest rate are statistically significant at 10% level of significance while in case of Australia and Singapore it is insignificant statistically. The coefficients of unemployment rate are negative for Australia, New Zealand and Korea, and bear correct sings which are consistent with the standard economic theory, except in the case of Singapore, for which the coefficient of unemployment rate is having positive sign. However, in case of Australia and Singapore the coefficient of unemployment is not statically significant while in case of New Zealand and Korea it is statistically significant at 1 % level of significance.

Table9: Long-Run Results of ARDL

Country	ln *CON*	ln *GDP*	ln *RIR*	ln *UR*	*Model*
Australia	*0.579****	*0.288***	*0.0016**	*-0.01804*	*ARDL(1,0,1,1,0)*
Korea	*0.640**	*0.334**	*-0.01238*	*-0.02451**	*ARDL(1,1,0,0,1)*
New Zealand	*0.657****	*0.286**	*-0.0474**	*-0.0128**	*ARDL(1,0,1,0,0)*
Singapore	*0.629**	*0.223**	*0.07465*	*0.05235*	*ARDL(1,1,1,1,1)*

Note: ***p<0.01, **p<0.05, * p<0.10.

5.2. Short-Run Results of ARDL

Table 10 offers the short run results of ARDL approach to co-integration for Australia, Korea, New Zealand and Singapore. The table also reported the coefficients of ECT which shows the speed of convergence from disequilibrium to equilibrium in next period. The values of ECT are pretty high in case of Australia, Korea, New Zealand and Singapore. The values of ECT for Australia, Korea, New Zealand and Singapore are -0.5185, -0.577, -0.483 and -0.657 respectively, which indicate that from disequilibrium towards equilibrium all these countries approach quickly to achieve equilibrium in the next period. In the short run, the real GDP has positive impact on ARPC, thus the values of MPCs out of real GDP are 0.5005, 0.434, 0.4178 and 0.510, showing that in the short run 1% increase in the real GDP will amplify the ARPC in case of Australia, Korea, New Zealand and Singapore by 0.5005%, 0.434%, 0.4178% and 0.510% respectively. Similarly, the MPCs out of wealth are statistically significant for Australia,

Korea, New Zealand and Singapore; a 1% rise in wealth leads to augment ARPC by 0.2885%, 0.193%, 0.179%, and 0.106% respectively. The coefficients of real interest rate and unemployment rate are negative for Australia, Korea, New Zealand and Singapore. However, in case of New Zealand the coefficient of real interest rate is statistically insignificant.While in the case of Australia the coefficient of unemployment rate is statistically insignificant. The coefficients of real interest rate are -0.028, -0.071, -0.237, and -0.068, which revealed that a 1% rise in the interest rate will reduce the ARPC by 0.028%, 0.071%, 0.237% and 0.068% respectively. Likewise, the coefficients of unemployment rate are; -0.0935, -0.0423, -0.0599, and -0.0853, indicating that a 1% increase in unemployment rate will shrink down the ARPC by 0.0935%, 0.0423%, 0.0599%, and 0.0853% respectively.

Table 10: Short Run Results of ARDL

Country	Australia	Korea	New Zealand	Singapore
$\Delta \ln CON$	*0.5005****	*0.434***	*0.4178****	*0.510****
$\Delta \ln GDP$	*0.2885***	*0.193***	*0.179**	*0.106**
$\Delta \ln RIR$	*-0.028***	*-0.071***	*-0.237*	*-0.068**
$\Delta \ln UR$	*-0.0935*	*-0.0423**	*-0.0599***	*-0.0853**
ECT (-1)	*-0.5185****	*-0.577***	*-0.483****	*-0.657**
R^2	*0.81*	*0.76*	*0.75*	*0.73*
DW	*2.092*	*1.86*	*1.94*	*1.79*
F- Stat:	*23.34*	*16*	*17.19*	*11.69*
χ^2_{LM}	*1.0709 (0.301)*	*0.617 (0.431)*	*0.313 (0.576)*	*0.3107 (0.577)*
χ^2_{RESET}	*1.100 (0.200)*	*1.089 (0.301)*	*0.640 (0.400)*	*1.823 (0.210)*
$\chi^2_{Normality}$	*2.010 (0.201)*	*1.982 (0.410)*	*0.861 (0.192)*	*1.210 (0.231)*
$\chi^2_{Hetro:}$	*5.0027 (0.025)*	*0.790 (0.021)*	*1.9188 (0.166)*	*1.1101 (0.292)*

Note: ***p<0.01, **p<0.05, * p<0.10.

6. CONCLUSION

The results of ARDL approach to co-integration show that the most important determinants of the ARPC in the short-run and the long-run are real GDP and wealth. Whereas, real interest rate and unemployment have significant effect on ARPC in the short run rather than the long run. The effect of real interest rate is mixed across theboard for Australia, Korea, New Zealand and Singapore. However,the signs of real interest rate coefficients are negative for all.On the other hand, the effect of unemployment rate is negative for all countries under study. In case of Australia, Korea, New Zealand and Singapore the coefficients of wealth are relatively small in the short run as compare to the long run coefficients. Thus, it shows that in the short run households of Australia, Korea, New Zealand and Singapore follow the rule of thumb while in long run they respond to their expected future income and follow PIH. Consequently, it provides evidence for the validity of AIH in the short run for Australia, Korea, New Zealand and Singapore.

References

Ahumada, H. Y Garegnani, M. L. (2000). Default and Devaluation Risks in Argentina: Long-Run and Exogeneity in Different Systems., *Anales de la 35ª ReuniónAnual de la Asociación Argentina de EconomíaPolítica. Córdoba,* Noviembre de 2000.

Cassar., J. and Gordon Cordina. (2001). Consumption Expenditure in Malta: Behavioral Trends During in 1990, *Bank of Velletta Review*, Vol (3) 23: 28-43.

Castro., G. L. De., (2006). Consumption, Disposable Incomes and Liquidity Constraints. *Economic Bulletin* ,Vol. (9) 3: 75-84

Campbell, J. Y. and Mankiw N.G., (1987). Permanent Income Current Income, and Consumption.,*NBER Working Paper No.* 2436, November 1987; Revised January 1989

Davidson, J.E.H. and Hendry, D.F. (1981). Interpreting Econometric Evidence: the Consumption Function in the United Kingdom.,*European Economic Review,*Vo. (4) 16: 177-192.

Duesenberry, J.S., (1948). *Income Saving and the Theory of Consumption Behavior*. Cambridge: Harvard University Press.

Engel, Robert F. and C. W. J. Granger, (1987).Co-integration and Error Correction: Representation. *Estimation, and Testing. Econometrica*, Vol 55(2): 251- 276.

Elwood, S, K,. (1997). Estimating Permanent and Transitory Components of GNP Using Consumption Information Southern. *Economic Journal*, Vol. 64(2): 567-575.

Harris, N. Mark., Loundes, J., and Webster, E., (1999). Determinants of Household Saving in Australia, Melbourne Institution. *Working Paper* No. 22/99 : Wily.

Haque, N.U. and Peter M., (1989). Consumption in Developing Countries, Tests for Liquidity Constraints and Finite Horizons.*The Review of Economics and Statistics*Vol 9(11):408-415.

Hausman, J.A., (1978). Specification Teat for Econometrics, *Econometrica,*Vol46 (4):1251-127.

Heymann, D. and Sanguinetti, P. (1998). Quiebres de Tendencia, ExpectativasFluctuacionesEconómicas.,

DesarrolloEconómico, Publicación Trimestral Del Instituto de DesarrolloEconómico Social, Vol. 38 (3), Abril-Junio, N 149.

Johansen, S., (1988). Statistical Analysis of Co-integrated Vectors, *Journal of Economic Dynamics & Control,*Vol. 12 (3): 231-54.

Johansen, S., (1995). A Statistical Analysis of I(2) Variables.*Econometric Theory,* 4*(*11): 25-59.

Joseph P. DeJuan John J. Seater Tony S. Wirjanto (2006). Testing the Permanent-Income Hypothesis:

New Evidence from West-German States (Länder), *Empirical Economics* 31 (3): 613–629.

Kandil,M., Mirzaie, I.A, (2006). Consumption and Macroeconomic Policies: Theory and Evidence from Developing Countries. The *Journal of International Trade & Economic Development: An International and Comparative Review*, 15 (4): 469-491.

Manitsaris, A., (2006). Estimating the European Union Consumption Function under the Permanent Income Hypothesis. *International Research Journal of Finance and Economics*, 2(3):1450-2887.

Mankiw, N.G., (1981). The Permanent Income Hypothesis and The Real Interest Rate.*Economics Letters*, 7(3):307-311.

Modigliani, F. and Brumberg, R.E., (1954). Utility Analysis and Aggregate Consumption Function: An Interpretation of Cross Section Data. In Post Keynesian Economics, K.K Kurinara (ed) (New Bruns Wick: Rutgers University Press 1954).

Modigliani, F. and Brumbergh, R., (1954). Utility Analysis and the Consumption.*Economics Journal*, 5(88):.661-692.

Rao, B.B., (2007). Testing the Permanent Income Hypothesis in the Developing and Developed Countries a Comparison between Fiji and Australia, School of Economies University of the South Pacific, Working Paper: No: 2007/09.

Shirvani, H. and Wilbratte, B., (2009). The Permanent Income Hypothesis in Five Major Industrial Countries: a Multivariate Trend-Cycle Decomposition Test.*Journal of Economics Finance,*4(33): 43-59.

Singh, B., (2004). Modelling Real Private Consumption Expenditure - An Empirical Study on Fiji. Economics Department Reserve Bank of Fiji Working Paper 2004/05.

Appendix

Annex 1: APCs' of Australia, Korea, New Zealand and Singapore (1985-2013)

Year	*Australia*	*Korea*	*New Zealand*	*Singapore*
1985	*0.605553*	*0.504825*	*0.685836*	*0.424000*
1986	*0.601541*	*0.488473*	*0.675746*	*0.440647*
1987	*0.583566*	*0.476831*	*0.612961*	*0.458802*
1988	*0.579309*	*0.450219*	*0.619253*	*0.477128*
1989	*0.579469*	*0.465823*	*0.624529*	*0.482336*
1990	*0.581573*	*0.476445*	*0.617375*	*0.47402*
1991	*0.597028*	*0.482523*	*0.606735*	*0.468147*
1992	*0.602439*	*0.492307*	*0.604699*	*0.465927*
1993	*0.591378*	*0.509803*	*0.586889*	*0.470561*
1994	*0.583808*	*0.525351*	*0.59338*	*0.457756*
1995	*0.579051*	*0.539729*	*0.586272*	*0.433270*
1996	*0.569681*	*0.544689*	*0.592199*	*0.437176*
1997	*0.576924*	*0.545659*	*0.594068*	*0.425414*
1998	*0.576296*	*0.531184*	*0.606815*	*0.408393*
1999	*0.579756*	*0.54725*	*0.598282*	*0.417413*
2000	*0.574585*	*0.560408*	*0.591197*	*0.426029*
2001	*0.572007*	*0.571071*	*0.584356*	*0.448663*
2002	*0.570874*	*0.581924*	*0.578461*	*0.452871*
2003	*0.570292*	*0.562033*	*0.58943*	*0.43556*
2004	*0.571623*	*0.537113*	*0.592239*	*0.414289*
2005	*0.567615*	*0.537919*	*0.594723*	*0.401307*
2006	*0.570663*	*0.53194*	*0.597739*	*0.391436*
2007	*0.582173*	*0.528808*	*0.594205*	*0.391228*
2008	*0.573009*	*0.523071*	*0.595691*	*0.391675*
Year	***Australia***	***Korea***	***New Zealand***	***Singapore***
2009	*0.573541*	*0.520366*	*0.591277*	*0.394114*
2010	*0.573796*	*0.509242*	*0.599237*	*0.366686*
2011	*0.573215*	*0.501454*	*0.590546*	*0.359129*
2012	*0.565217*	*0.504578*	*0.591176*	*0.346686*
2013	*0.557627*	*0.510192*	*0.589477*	*0.339129*
Mean	*0.578745*	*0.519353*	*0.602924*	*0.424131*
Maximum	*0.605553*	*0.581924*	*0.685836*	*0.482336*
Minimum	*0.557627*	*0.450219*	*0.578461*	*0.339129*
S.D	*0.011395*	*0.032230*	*0.024138*	*0.039961*

JB	*3.873239*	*0.465351*	*62.22117*	*1.597104*
Prob:	*0.144191*	*0.792411*	*0.000000*	*0.449980*

Figure 1. Australia

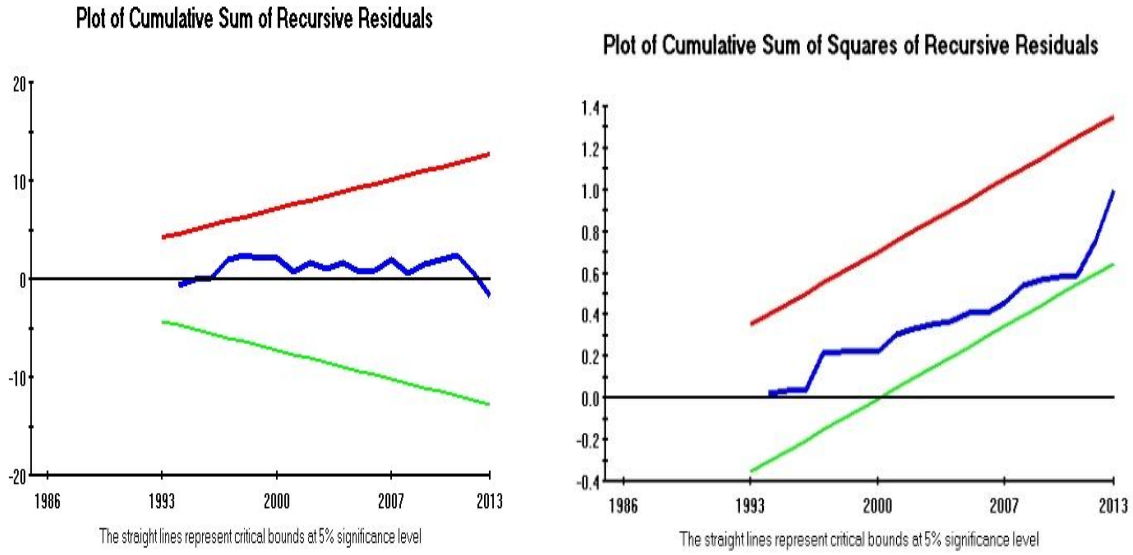

Figure 2 Korea

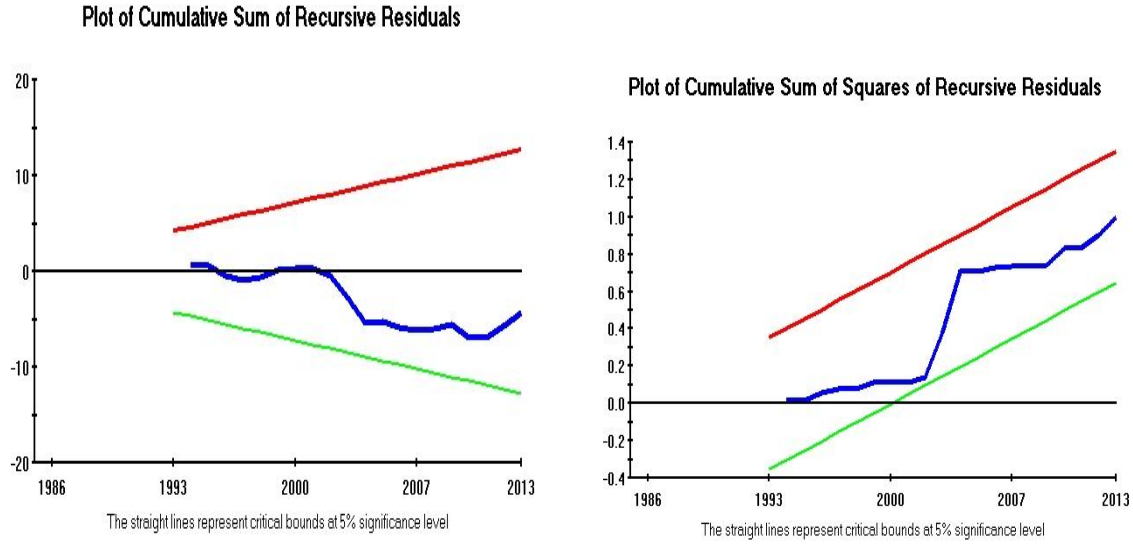

Figure 3 New Zealand

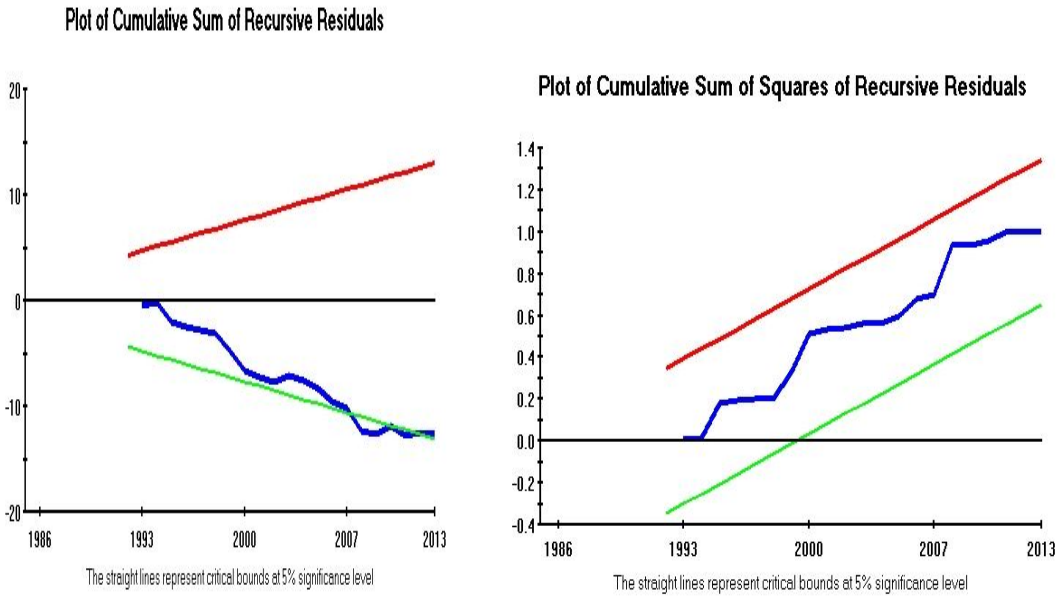

Figure 04 Singapore