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An Assessment of the Consumption Function for Iran

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Abstract

In this study, the real private consumption model for Iran was estimated by applying yearly data from 1990 to 2018. The ARDL method is used to assess short-term and long-term relationships between private consumption, labor income, interest rate, wealth, and unemployment rate. According to long-term estimates, income and wealth determine the actual consumption in Iran. However, in the short run, current incomes, wealth, real interest rates, and the unemployment rate are the key determinants of private consumption in Iran. The dynamic of the consumption function shows that all the factors of consumption i.e. real disposable income, wealth, and unemployment rate, real interest rate, have a noteworthy effect on aggregate consumption. The minor and significant coefficient of wealth indicates that the consumption decision is weakly affected by wealth. It provides evidence of the validity of AIH for Iran.

Keywords: Autoregressive distributed lag model (ARDL), Absolute income hypothesis (AIH), real private consumption.

Introduction

The consumption function is one of the key macroeconomic relationships. Keynes postulated that the fraction of income that individual devoted to his consumption depends upon the level of current income. When the current income of an individual increases the fraction of income that devoted to consumption also increases, but not in the same proportion, in other words we can say that the Average Propensity to Consume (APC) is continuously decreasing with every increase in current income. In consumption literature, the Keynes's law of consumption is recognized by the AIH. Consumption is less volatile than investment, and MPC plays a dominant role in the determination of aggregate demand. Private consumption in Iran is three times larger than investment so private consumption becomes the cornerstone of aggregate demand theory. Henceforward, keeping in view the importance of consumption for aggregate demand the objectives of this study is to assess short-run and long-run consumption functions for Iran.

Kuznets (1946) empirically tested the AIH with time series and cross-section data. The results show the contradiction of AIH with the US empirical data i.e., In the long-run, APC remains constant with the increase of current income. Rao (2005) used the Campbell and Mankiw consumption (C&MC) model and tested the PIH for Fiji. Dejuan et al. (1997) used the cross-section data of eighty-seven countries to check the validity of PIH. Dejuan et al. (1999) used microdata to exam the PIH for US economy and his major finding was that consumption behaviors of individuals are consistent with the permanent income life cycle hypothesis. Drakos et al. (2002) examined that total

consumption of Greece. He was concerned to discover the explanations for the refusal of PIH in Greece.

Lek Goh et al (2002) estimated consumption function for New Zealand which based on the life cycle and permanent income hypothesis; the long-run relationships are estimated through using the error correction models. This study was used different types of variables for wealth and liquidity and found the significant effect of mortgage equity variable on consumption which is used as a proxy of liquidity for households. The next variable is net migrant transfers; to capture the effect remittances, it has a significant effect on short-run consumption, as well as non-financial wealth, have found to have a short-run effect on consumption growth but no long-run effect. While on the other hand, monetary wealth has no short-term influence, but it has a long-run effect on consumption. Lavi (2003) examined the rate of change in per capita private consumption can be projected based on the rate of change of predictable income.

Singh (2004) presented a model of real private consumption expenditure for Fiji, to find the main determinists of private consumption expenditure in case of Fiji. The Error Correction Model (ECM), is used to capture dynamic adjustment effects from 1979 to 2001. The results of the study suggested that Fiji's real private consumption approach quickly to equilibrium levels in current period from a disequilibrium in the earlier period. In the short-run, income, wealth, real interest rate and net private transfers have a significant effect on real private consumption growth while in the long run wealth and income was determining long-run consumption growth.

Dejuan et al. (2006) examined the PIH for 11 territories in West German. The empirical results do not support PIH as a whole for Germany and separately for each state. He found that consumption response asymmetrically to income innovation. The evidence of asymmetry shows the presence of liquidity constraints for consumers. Rao (2007) used Hall's random walk and C&MC model and tested the PIH for developing and developed countries. i.e. Fiji and Australia. The study suggests that in developed countries the possibilities and prospects for inter-temporal substitution are usually greater than emerging nations. He also estimated with the help of C&MC model that the proportion of consumers that follow the PIH in Australia and Fiji. The empirical results showed that PIH households are 40% greater in Australia than Fiji. Liu et al. (2007) checked PIH with Hong Kong's spending data. He fined that before 1997 the Hong Kong's consumption data weakly supported the PIH while rejected for the sample period after 1997. Besides that, he also fined that Hong Kong's consumption is affected from expected income and wealth while temporary tax changes may some impact on consumption of durable goods. Shirvani and Willbratte (2008) tested PIH for Canada, Italy, UK, France, and the USA. He used the multivariate stochastic detrending approach developed by Valid and Engle (1997) to test the PIH for these countries. Shirvani and Willbratte (2008) fined that the PIH is valid in Canada, France, Italy, UK, and the US. Similarly, Khan (2011) and Khalid (2015) tested that AIH and PIH and concluded that most families are following the AIH. Likewise, Khalid (2015), Khan (2012) also estimated the Aggregate consumption function for which indicated that the critical determinant of consumption is household's disposable income.

The rest of the study is organized as follow: the forthcoming section offers methodology while third and fourth sections are based on empirical results and conclusion of the study, respectively.

Methodology

Consumption Function Modeling

On the basis of PIH and Life Cycle Hypothesis (LCH) we can write the consumption function of long run in the subsequent form:

$$C_t = f(Y_t, W_t, X) \quad (1)$$

Whereas Y is national income, C is private consumption, W is wealth in period t and X is the vector of all other short run determinants. Therefore the long run consumption can be estimated is as follows:

$$ln\, C_t = \alpha_0 + \alpha_1\, ln\, Y_t + \alpha_2\, ln\, W_t + \varepsilon_t \quad (2)$$

All the variables are previously defined; whereas ε_t is the long run error term. The above equation (2) is established on the PIH and LCH; according to these hypotheses, individuals can divide their consumption between present and future, subject to their overall stock of wealth.

ARDL Framework

To probe the long-run stability for the time series data various econometric techniques are used in the previous decades. These methods are maximum likelihood-based Johnsen (1988), Engle and Granger (1987), FMOLS method of Phillips and Hansen (1990), Johases-Juselius (1990) and Johansen's (1996) full information maximum likelihood methods. All these methods are applicable when the variables in the model are stationary in the first order. Furthermore, these techniques are also suffering from low-slung potency in case of small sample properties. Thus, to overcome these difficulties, Pesaran and Shin (1999) and Perasan et al. (2001) propose a new technique which is known as autoregressive distributed lag (ARDL) approach. The ARDL has several econometric pluses over previous cointegration methods. Initially, the ARDL approach can be applied without pre-testing of a unit root. Secondly, it simultaneously estimates the long and short-run coefficients of the model. Thirdly, the ARDL model assumed that all variables are endogenous. Finally, the ARDL model contains greater number of variables than other co-integration methods.

Before the application of ARDL model, initially the study tested all variables for stationarity if all of the variables are stationary in the first order or second order or mixed of both, then the ARDL model will be applicable, which consists of two steps: at first, all variables of the model are tested for the presence of the long-run association, and on the basis of PIH and LCH we can write the long-run consumption function in the subsequent form: Where X is the vector of all other short-run determinants.

To estimate the ARDL model for above consumption function for this purpose the ARDL representation of above function is as under

$$\Delta\, ln\, C_t = \alpha_0 + \sum_{i=0}^{n} \alpha_i \Delta\, ln\, Y_{t-i} + \sum_{i=0}^{n} \delta_i\, \Delta\, ln\, W_{t-i} + \sum_{i=0}^{n} \eta_i\, \Delta\, ln\, C_{t-i} + \sum_{i=0}^{n} \psi_i\, r_{t-i} + \sum_{i=0}^{n} \rho_i ur_{t-i} + \gamma_1\, ln\, Y_{t-1} + \gamma_2\, ln\, W_{t-1} + \gamma_3\, ln\, C_{t-1} + \gamma_4 r_{t-1} + \gamma_5 ur_{t-1} + u_t \quad (3)$$

Where "r" is the real interest rate "ur" is the unemployment rate and "u" is the random error term, while the coefficients $\alpha_i, \delta_i, \eta_i, \psi_i$ and ρ_i contains short run information while $\gamma_1, \gamma_2, \gamma_3, \gamma_4$ and γ_5 contain the long run information. The study tested the following hypothesis for equation (16):

$H_0 = \gamma_1 = \gamma_2 = \gamma_3 = \gamma_4 = \gamma_5 = 0$ (no co-integration)

$H_1 = \gamma_1 \neq \gamma_2 \neq \gamma_3 \neq \gamma_4 \neq \gamma_5 \neq 0$ (co-integration) (4)

To assess the hypotheses, for this purpose we used the bounds test. We evaluate the calculated F-statistic value with tabulated values provided in Pesaran and Pesaran (1997) and Pesaran *et al*. (2001). If our calculated value of F-statistic is bigger than the upper level of the bound, then the null hypothesis can be denied. If the calculated value of F-statistic falls lower than the lower bound values, then null hypothesis cannot be denied and if the F-statistic drops between the bounds then the outcome would be uncertain. However, the lower and upper bounds presume that variables are stationary at level and first difference respectively. The equation (05) will be estimated if there is the confirmation of co-integration between the variable of the model

$$\Delta \ln C_t = \alpha_0 + \sum_{i=0}^{n} \alpha_i \Delta \ln Y_{t-i} + \sum_{i=0}^{n} \delta_i \Delta \ln W_{t-i} + \sum_{i=0}^{n} \eta_i \Delta \ln C_{t-i} + \sum_{i=0} \psi_i r_{t-i} + \sum_{i=0}^{n} \rho_i ur_{t-i} + u_t \quad (5)$$

After the confirmation of the co-integration between the variables then we estimate the equation (6) of error correction model (ECM), which confirms the speed of adjustment from divergence to convergence.

$$\Delta \ln C_t = \phi + \varphi(ECM)_{t-1} + \sum_{i=0}^{n} \alpha_i \Delta \ln Y_{t-i} + \sum_{i=0}^{n} \delta_i \Delta \ln W_{t-i} + \sum_{i=0}^{n} \eta_i \Delta \ln C_{t-i} + \sum_{i=0}^{n} \psi_i r_{t-i} + \sum_{i=0}^{n} \rho_i ur_{t-i} + \varepsilon_t \quad (6)$$

Furthermore, to ensure the stability of the model for this purpose we use the diagnostic and stability tests for ARDL model, in diagnostic test we observe the problems of; serial correlation, normality, functional form, and hetroscedasticity.

Results and Discussion

Before the assessment of the ARDL model first we test the variables of the model for stationary by applying the Augmented Dickey-Fuller (ADF) test. However this test of stationarity is not compulsory for ARDL, but it tell us that whether the ARDL model is applicable on this data or not. Table 1 presented the outcomes of the Augmented Dickey-Fuller (ADF) analysis which indicates that private consumption, GDP, quasi money and unemployment rate are stationary at first difference whereas discount rate is stationary at level.

Table 1. Results of ADF Test

Variables	Lag 1	Lag 2	Lag 3
C	-1.092	-1.091	-0.781
Δ C	-5.948***	-6.981***	-4.091**
Y	-0.761	0.871	-0.341
Δ Y	-4.278*	-3.201*	-5.519*
W	-1.920	-1.004	-1.003
Δ W	-6.100***	-6.000***	-4.122**
r	-2.260*	-2.001	-2.101
Δ r	-6.402***	-6.970***	-7.006***
ur	-2.210	-1.180	-1.370
Δ ur	-4.030***	-3.091*	-3.011*

Note: ***, **, * indicate 1%, 5% and 10% level of significance respectively.

Table 2 offered the results of ARDL approach based on Schwarz Bchwarz Criterion. It reveals that labor income, quasi money and interest rate are statistically significant while unemployment rate have not significant impact on private consumption.

Table 2. ARDL Results (1,1,1,0,1),

Variables	Coefficient	T-Values	P-Values
C_{t-1}	0.341	3.801	0.001
Y	0.671	3.817	0.001
Y_{t-1}	-0.213	-1.012	0.088

Variables	Coefficient	T-Values	P-Values
W	-0.410	-3.012	0.006
W_{t-1}	0.651	4.760	0.000
r	0.012	3.510	0.001
ur	-0.001	-1.001	0.319
ur_{t-1}	6.23E+07	2.231	0.026
R^2	0.84.00	Adj: R^2	0.83.01
AIC	-789	SBC	-890
DW	1.901	F-Sat(4,28)	120(0.000)

Note: *, **, *** indicate significance level on 1%, 5% and 10%.

Table 3 reported the different critical values of bound testing approach and show that the calculated F-statistics i.e. 9.012, is greater than the upper bound critical values on all conventional levels, therefore it is rejected the null hypothesis of no long run association and accept the hypothesis of existing long run connection.

Table 3. ARDL Co-Integration Test

$F_c = 9.012$	$F(Con/Y, W, r, ur)K = 4$	
Critical Value	**Lower Bond**	**Upper Bond**
1%	2.425	3.574
5%	2.850	4.049
10%	3.817	5.122

Table 4 exhibits the long run coefficients of the variables through ARDL approach. It shows that the coefficients of interest rate and unemployment rate are not statistically significant although the labor income and wealth are statistically significant and having positive effect of households' consumption in Iran.

Table 4. Long Run Results of ARDL

Variables	Coefficient	T-Values	P-Values
Y	0.761	3.010	0.005
W	0.102	2.120	0.040
r	-0.001	-0.0231	0.501
ur	0.00121	0.8231	0.510

Table 5 reported the results of error correction model (ECM) all of the above long run relationship illustrated in table 4. The ARDL based error correction model shows that all of the variables in the model are statistically significant except unemployment. The coefficient of ECM is statistically significant and having negative sign i.e. -0.48, which implies, a high speed of convergence to equilibrium. The coefficient of ECM which is -0.48 implies that deviation for long-term equilibrium is corrected by 48.00 percent over each year.

Table 5. ECM Results

Variables	Coefficient	T-Values	P-Values
ΔY	0.720	3.012	0.000
ΔW	-0101	-2.912	0.004
Δr	1.21E+08	3.501	0.002
Δur	-1.37E+08	-1.021	0.412
$ECM(-1)$	-0.480	-3.981	0.000
R^2	0.721	**Adj:** R^2	0.701
AIC	-789	**SBC**	-80
DW	1.910	F-Sat(4,28)	25(0.000)

We also applied different Diagnostic tests to the ECM to check hetroskedasticity, serial correlation and Autoregressive Conditional Heterosdasticity (ARCH) effect in the disturbances, but there is no evidence of Hertoskedasticity, serial correlation and ARCH. We also applied Jarque-Bera normality test which implies that the stochastic terms are normally distributed.

Conclusion

This study is an attempt to assess the consumption function in the case study in Iran, based on the ARDL approach, in order to find short and long-term determinants of actual private consumption in Iran. The results show that current income and assets have a significant impact on actual private consumption in the long run. The current income and long-term assets ratio are 0.72 and 0.10 respectively. This shows that 72% of consumers are making consumption decisions on current incomes. While only 10% of consumers make their own decisions about their present and future wealth. In other words, it shows that the assumption of absolute income is valid in Iran. Therefore, it can be said that consumer behavior is determined by all the relevant variables described above in the short run. The decision of consumers depends heavily on current income while weakly on wealth, current interest rates and employment opportunities.

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