Journal of Economics and Sustainable Development www.iiste.org
ISSN 2222-1700 (Paper) ISSN 2222-2855 (Online)
Vol.6, No.17, 2015

Real Private Consumption Expenditure Modeling An Empirical Study on Pakistan

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Abstract
This paper presents a model for Pakistan's real private consumption expenditure, with the aim of generating a better understanding of the factors that determine private consumption in Pakistan and for the purpose of forecasting consumption expenditure growth. The model is estimated over period 1971 to 2012 as an (ARDL), allowing for lagged terms so as to capture dynamic adjustment effects. The results suggest that Pakistan's real private consumption adjusts fast to equilibrium levels in the current period (t), from a disequilibrium experienced in the previous period (t-1). In the short run, real private consumption growth is significantly affected by changes in wealth and unemployment rate. The relationship between consumption, wealth income, rate of interest and unemployment rate. Both the wealth variable and unemployment are significant in determining long run consumption growth, moreover, results of the forecast evolution indicate that the parsimonious short run model has the potential to provide reliable consumption forecasts in the medium term.

1. Introduction

Private consumption expenditure is the largest component of total spending in Pakistan, and accounts for around two-third of the nation's Gross Domestic Product (GDP). Private Consumption between 1971 and 2010 has averaged around 65 percent of GDP annually. This makes private consumption in Pakistan an extremely important component of aggregate demand, not only because it influences economic growth, but also in the determination of the economic cycle. In this respect, the study of consumption is relevant.

The consumption function has featured in macro-models since Keynes (1936), followed by Modigliani and Brumburg (1954), Friedman (1957), Hall (1978), and the influential consumption model of David, Hendry, Srba and Yeo (1978). Theories and empirical evidence of these studies have formed the foundation for many later studies in consumption behavior.

In this paper, an econometric consumption model for Pakistan is constructed. The ARDL approach is employed and time series data is used in the regression. The primary purpose of this study is to generate a better understanding of the factors determining private consumption in Pakistan and to estimate a consumption function to be used for medium term forecasting.

One of the more surprising discoveries in macroeconomic theory over the past twenty years has been how much the solution to the optimal inter-temporal consumption problem can change when income uncertainty is introduced into the problem. In an important early paper, Zeldes (1989), using numerical methods, found that introducing labor income uncertainty made the consumption function concave, with the marginal propensity to consume everywhere higher than in the certainty case. Kimball (1990a, 1990b) gives the analytical explanation for the increase in the slope of the consumption function, but until now there has been no analytical explanation for the concavity of the consumption function that income uncertainty seemed to induce.

The idea that the consumption function is concave is an old one, dating at least to the origin of Keynesian macroeconomics: The General Theory of Employment, Interest, and Money emphasized the central importance of the consumption function, and explicitly argued that the consumption function is concave. We show that, except under very special conditions, adding income uncertainty to the standard optimization problem induces a concave consumption function in which, as Keynes suggested the marginal propensity to consume out of wealth or transitory income declines with the level of wealth.

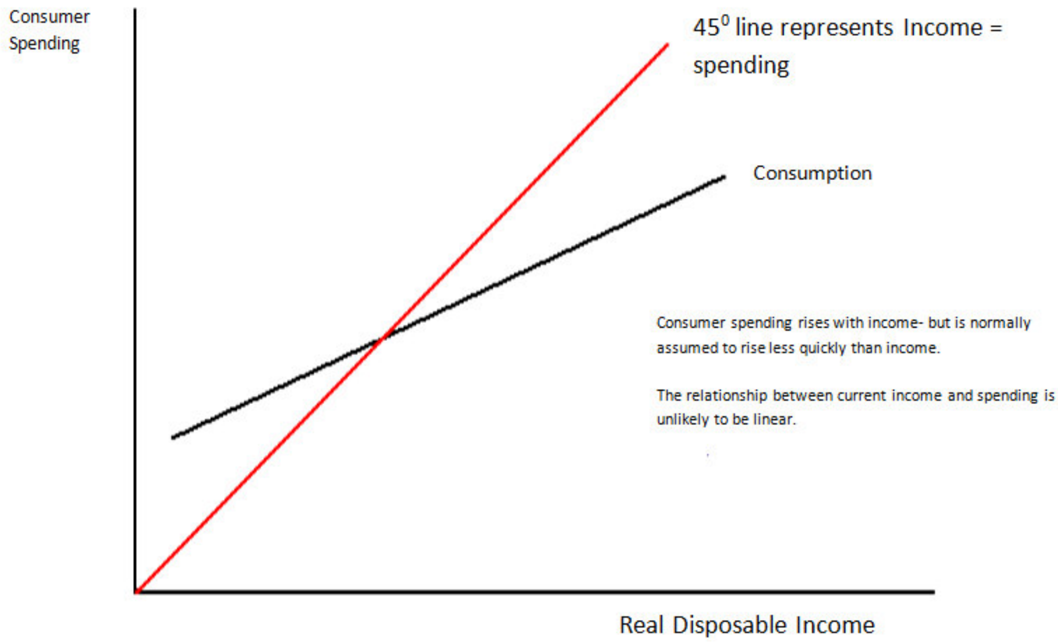

Figure 3 Consumption line

The main objective of this study is to determine the factor which includes private consumption in Pakistan and to estimate the macro variables. Aggregate demand is one of the most important factor which enhances economic growth and economic cycle. So consumption is expressed as explanatory variables such as national disposable income, wealth, and those that capture income for forecasting consumption fluctuates due to changes its explanatory variable.

Consumption is expressed as a function of explanatory variables such as income, wealth and those that capture income uncertainty and intertemporal substitution effects. Such studies have been common in developed countries, but are limited in small developing countries such as Pakistan, due to unavailability of data on all key variables. Omission of these variables form a consumption model implies that consumption in the model is miss-specified thus raising the familiar econometric problems of spurious regression and omitted variable of measurement errors. The rest of the paper is structured as follows: Sections 2 briefly reviews literature. Section 3 provides a commentary on the trends in real private consumption growth for the sample period 1979 to 2001. The subsequent section sets out the consumption model, while Section 5 discusses the methodology. Section 6 presents the empirical results and the final section concludes the paper.

2. Literature Review

There is a long tradition of theoretical and empirical work on consumption. Aggregate consumption has featured in macro-models since Keynes (1936) and is especially important for growth in a transitional economy. Keynes (1939) postulates the consumption function as the relationship between consumption and disposable income. The Keynesian model of consumption takes consumption as a fixed portion of current income. This is known in consumption literature, as the Absolute Income Hypothesis (AID). This hypothesis implies that people adapt instantaneously to changes in income. The AID proved to be a good first approximation when the economy was stable.

Bimal Singh (2004-05) studied about modeling real consumption expenditure of Fiji over the period 1979-2001 by using an error correction model and used lagged terms in order to capture the dynamic adjustment effects of private consumption in Fiji. He argued that private consumption is the largest component of total GDP round about 2/3.

The final results of this study show the long run and short run relationship between consumption and its explanatory variables. In the long run the relations between those variables show that consumption is significantly determine by income and wealth while in short run consumption is determined by real interest rate.

However, theoretical and empirical limitations of Absolute Income Hypothesis (AIH) led to the development of the Life-Cycle Hypothesis (LCH) by Modigliani and Brumburg (1954) and the Permanent Income Hypothesis (PIH) by Friedman (1957). LCH says that income varies systematically over the phases of the consumer's life cycle and saving allows the consumer to achieve smooth consumption. To begin with when individuals start work, income is usually lower than expected, so individuals will borrow; then as their salaries increase as a result of promotions, they will start paying off their debts; finally, they save for their retirement. It should be noted that saving and dissaving will not necessarily be equal, as interest on borrowing will diminish the savings considerably. Furthermore, LCH is also heavily influenced by wealth other than income. If life begins with a certain amount of money, this money will be spent over the lifetime, thus increasing the level of permanent income, and the amount of saving and dissaving will later accordingly. However, net savings is likely to decrease, as consumption will be boosted by the availability of wealth.

PIH is based on the assumption that people prefer their consumption to be smooth rather than volatile. Consumers attempt to maintain a fairly constant consumption pattern even though their income may vary considerably over time; moreover, they prefer to buy similar quantity of goods from week to week, from month, and so on. In order to test the PIH theory, Friedman (1957) assumed that on average, people would base their idea of permanent income on what had happened over the past several years. Hence, the PIH introduces lags in the consumption function. An increase in income should not immediately increase consumption spending by very much, but with time it should have a greater effect.

Hall (1978) took the Life cycle-permanent income approach and applied Rational Expectations Hypothesis (REH). Specifically, the REH implies that people behave as though they have knowledge of the process of generation income. Therefore, people will not change their level of consumption unless new information causes them to revise their future expectations of income. Hall argues that the underlying behavior of consumers makes both consumption and wealth evolve as a random walk. This is so, since marginal utility evolves as a random walk with trend. Hall suggests that the PIH/LCH of consumption can be formally tested by including lagged variables, such as measures of income and wealth in an auto regression on consumption. According to Hall, for PIH/LCH (under REH) to be consistent with data, all coefficients for lagged variables except for that of the first lag of consumption must be statistically insignificant. Using quarterly US data, Hall shows that lags of consumption be young the first lag were not significant, however, Hall's results also show marginal evidence that recent lags of disposable income had predictive powers for consumption, and stronger evidence in favour of lagged measures of wealth such as the price of shares.

Flavin (1981) revisits Hall's hypothesis using a structural econometric model of consumption based on the innovation process in income driving changes in consumption. She finds that consumption is more sensitive to changes in income than proposed by the PIH/LCH. This phenomenon is called "excess sensitivity of consumption."

Campbell and Mankiw (1990) also find little support for PIH. Their model is based on the assumption that while proportion of the consumers base their consumption decisions on the Keynesian AIH, of spending current income, the reminder (1-γ) proportion use the optimization model. Campbell and Mankiw found that about 50 percent of the consumers in United States base their consumption decisions on current income and hence, violate the PIH.

Furthermore, well developed financial markets that allow consumers to borrow against future income in order to maintain a regular consumption path is a key assumption in Hall's model. It would therefore not be recommended as an appropriate approach to model consumption in developing countries where financial markets are underdeveloped.

Another influential approach to modeling consumption is the error correction model that of Davidson, Hendry, Srba and Yeo (henceforth DHSY) (1978). The authors present a dynamic time series model of consumption based on the underlying long run equilibrium relationship between consumption and income. In this approach, it is assumed that the long run relationship during any point in time between income and consumption may be out of equilibrium. This suggests that consumers take time to adjust to changes in income. On the contrary, if such time allowances did not take place, the adjustment would take place immediately.

Early empirical evidence on the DHSY model was favorable, e.g. Davis (1984). Having test a number of alternative consumption models, Davis concluded that the DHSY model is the best specification for United Kingdom. Molana (1991) also applied the ECM approach and concluded that the ECM would be appropriate in specifying the relationship between consumption and wealth. In another study, Chambers (1991) applies the same approach and finds the ECM to produce good forecasts for the UK economy.

Kazmi (1994) uses time series data his dependent variable is private consumption and independent variables are per capita income, wealth, Govt. purchases, transfer payments, tax and public debt in his model the public debt is insignificant and all other variables are significant. Saad (2011) uses Johnson cointigration for the data of (1970-2008) on disposable income, rate of interest, inflation and wealth as independent variable and real private consumption as dependent variable. Except rate of interest all the other variables are highly significant with consumption. Caglayan (2012) studies house hold consumption expenditure in which he uses disposable income, education age, wealth and money supply as independent variables. He finds that national disposable is positively significant with house hold consumption expenditure.

Moreover, alternative theories and other empirical evidence from advance industrialized countries suggest that consumption is also determined by additional variables, such as demographic factors, liquidity constraints and uncertainty. These variables together with income and wealth will be taken into consideration when specifying and appropriate model for Pakistan's private consumption expenditure.

Tends in Real Private Consumption Growth

Over the sample period (1971-2010), the growth in real private consumption has been quite volatile.

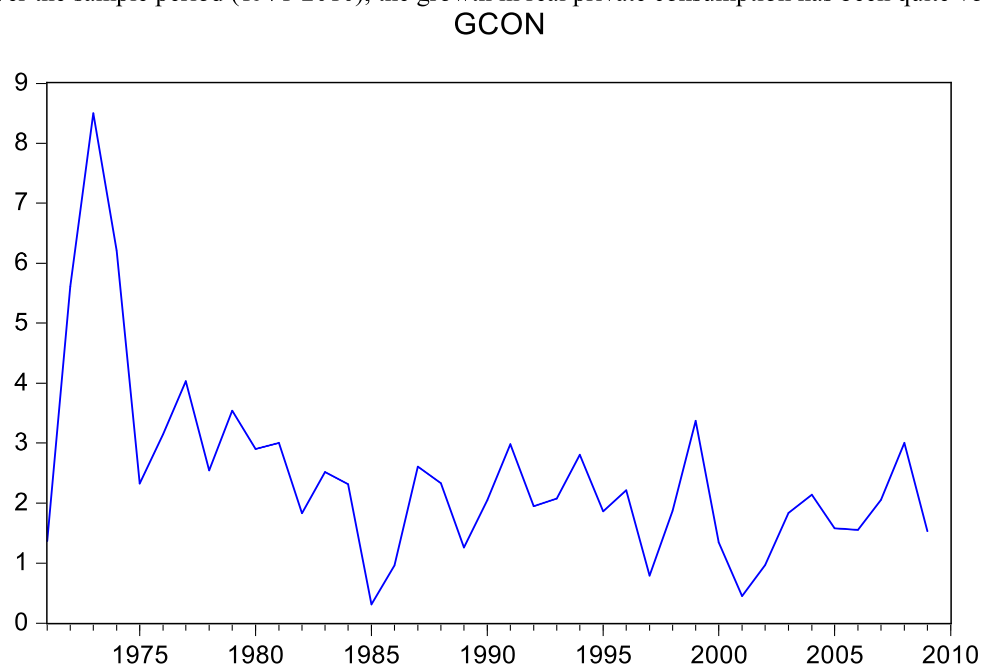

Figure 2 Government Consumption

In the early 1985 and 2002 growth in real private consumption was weak. The weak consumption growth resulted mainly from low levels of household disposable income. However, in 1973 the real private consumption growth accelerated (from a low 1.5 percent in 1971 to an all-time-high of around 8.5 percent in 1973). Higher levels of household disposable income and the low real interest rate largely contributed to the acceleration in this consumption growth.

Between 1975 and 1985, growth in real private consumption declined tremendously reaching the all-time-low of 0.31 percent in 1985. The decline was largely attributable to high real interest rate. However, between 1987 and 2002 growth in real private consumption was mixed. Consumption growth recovered in 1999 to around 3.38 percent, followed by a three-year downturn ending in 2001 (to around 0.45 percent). In 2008 however, growth in real private consumption increased rapidly to around 3.0 percent.

3. Consumption Model

Having reviewed the theory and empirical findings of past studies, a consumption function can be expressed as:

$$C = f(Y, W, Z) \qquad (1)$$

Where consumption C_t is a function of national disposable income Y_t, wealth W_t and a vector Z for other determinants, which captures liquidity constraints, substitution effects and uncertainties in the short run.

Following Davidson and Hendry (1981), Blinder and Deaton (1985), Macklem (1994), Tan and Voss (2000), Goh and Downing (2002), amongst others, the long run (steady sate) between Consumption, wealth and income are estimated in the long run consumption function as follows:

$$\log C_t = \alpha + \beta_1 \log Y_t + \beta_2 \log W_t + \beta_3 \log Z_t \qquad (2)$$

Where C_t is private consumption, Y_t is disposable income, W_t is the wealth variables and Z_t is the other factor variable which effect the consumption like as rate of interest and unemployment rate. The long run consumption function is based, fundamentally, on the PIH/LCH. Consistent with the PIH/LCH, it is assumed that households divide their consumption between the present and the future, based on estimates of their ability to consume in the long run. Households try to smoothen their consumption over time and save to spend in retirement. Moreover, households choose their consumption level based on their overall stock of wealth, which includes human wealth as well as non-human wealth. The most common approach taken is to assume that human wealth is proportional to current income. Hence, the above equation is a function of current income, current wealth and other factor variables. Since the household balance sheet is not published for Pakistan, a proxy for personal sector wealth had to be found. Proxies such as stock price (Hall, 1978) and broad money M2 (Bredin and Cuthbertson, 2001) have been used in the past. However, Quasi money is an appropriate proxy to use in this study. Quasi money comprises of mostly time and savings deposits of resident sectors and is also a component of households' holdings of broad money.

To capture the speed of adjustment and the short run dynamics, and error correction model can estimate in the following from:

$$\Delta LCONS_t = \theta_0 + \sum_{i=1}^{p1} \alpha_{1i} \Delta LNDI_{t-i} + \sum_{i=1}^{p2} \beta_{1i} \Delta LM2_{t-i} + \sum_{i=1}^{p3} \gamma_{1i} \Delta LINT_{t-i} + \sum_{i=1}^{p4} \delta_{1i} \Delta LUR_{t-i} + \varepsilon_t \quad (3)$$

Where all variable are as previously defined, except which is the first difference operator, the one period lagged error correction term estimated from equation (2) and is the short run error term. the coefficient on the lagged error correction term measures the speed of adjustment from a disequilibrium position, which may be brought about as a result of shock(s) to the system.

Existing consumption literature is relied upon to choose the appropriate variables for Z. in most empirical studies the common variables considered for Z have been real interest rate and unemployment rate. The real interest rate is taken to reflect the substitution effects (time preference for households to consume now in future), while the unemployment rate is considered as a proxy for uncertainty concerning the future flows of income.

For the purpose of this study, the choice of the unemployment rate and real interest rate are appropriate variables for Z.

These proxies together with contemporaneous as well as lagged differences of income and wealth, and log of consumption (lagged difference only) can be specified more specifically as:

$$\Delta LCONS_t = \theta_0 + \sum_{i=1}^{p1} \alpha_{1i} \Delta LNDI_{t-i} + \sum_{i=1}^{p2} \beta_{1i} \Delta LM2_{t-i} + \sum_{i=1}^{p3} \gamma_{1i} \Delta LINT_{t-i} + \sum_{i=1}^{p4} \delta_{1i} \Delta LUR_{t-i} + \sum_{i=1}^{p5} \Delta \kappa_{1i} LCONS_{t-1} + \varepsilon_t \quad \mathbf{(4)}$$

Where ur is the unemployment rate and int is the real interest rate. All the other parameters are the same as defined in equation (3).

4. Data

For the empirical analysis annual time series data form 1971 to 2010 is used. The data is obtained from the IMF International Financial Statistics, the Pakistan Bureau of Statistics and Economic survey of Pakistan. Where relevant, all data series were deflated and expressed in real terms. Actual data was available for all variables except for the wealth variable where quasi money is used as a proxy.

5. Methodology

For this purpose I apply the time plot to check the pattern of data whether the data has intercept and trend or not. After applying the time plot I apply the Unit Root test. For the stationary of data. In unit root I used the Augmented Dickey-Fuller test. Although the test of stationary is not prerequisite for the ARDL based cointegration.

5.1 Cointegration

There are three test of Co-Integration.

1. Residual Base EG test.
2. Johnson cointegration test.
3. ARDL test.

5.2 ARDL Approach To Cointegration [Pesaran Et Al (2001):

Unlike the EG and Johansen approach, no pre-testing of unit root is required as the test is applicable for both I(0) and I(1) variables. Many authors see this as the biggest advantage of the ARDL approach. A related advantage is that the unit root test have low power and often the decision regarding order of integration is in doubt. Moreover the above tests are subject to pre-test bias. Which distort size of the tests. Actual size may be more than the nominal 5%. That is why it is advised to use larger level of significance such as 10% rather than 5% for these tests. ARDL approach is free of such pre-test bias. As these distortions are severe in small sample, the ARDL is particularly suitable for small samples.

A disadvantage is that this method can only identify one cointegration relationship. Perasan et al. (1996) have tabulated two sets of appropriate critical values. One set assumes all variables are I(1) and another assumes that they are all I(0). This provides a band covering all possible classifications of the variables into I(1) and I(0) or even fractionally integrated. If the calculated F-statistics lies above the upper level of the band, the null hypothesis is rejected, indicating cointegration. If the calculated F-statistics falls below the lower level of the band, the null cannot be rejected, supporting lack of cointegration. If however, it falls within the band, the result is inconclusive. In that case significance of ECM term in Error Correction model will be helpful in decision about cointegration.

In our model all variables are expressed in natural logarithms in order to estimate their elasticities. The traditional approach to determining long run and short run relationships among variables has been to use the standard Johanson Cointegration and VECM framework, but this approach suffers from serious flaws as discussed by Pesaran et al. (2001). We adopt the autoregressive distributed lag (ARDL) framework popularized by Pesaran and Shin (1995, 1999), Pesaran, et al. (1996), and Pesaran (1997) to establish the direction of causation between variables. The ARDL method yields consistent and robust results both for the long-run and short-run relationship between consumption and various policy variables. This approach does not involve pretesting variables, which means that the test for the existence of relationships between variables is applicable irrespective of whether the underlying regressors are purely *I(0)*, purely *I(1)*, or a mixture of both. In order to obtain robust results, we utilize the ARDL approach to establish the existence of long-run and short-run relationships. ARDL is extremely useful because it allows us to describe the existence of an equilibrium/relationship in terms of long-run and short-run dynamics without losing long-run information. The ARDL approach consists of estimating the following equation.

$$\Delta LCONS_t = \theta_0 + \sum_{i=1}^{p1} \alpha_{1i} \Delta LNDI_{t-i} + \sum_{i=1}^{p2} \beta_{1i} \Delta LM2_{t-i} + \sum_{i=1}^{p3} \gamma_{1i} \Delta LINT_{t-i} + \sum_{i=1}^{p4} \delta_{1i} \Delta LUR_{t-i} +$$
$$\lambda_1 LNDI_{t-1} + \lambda_2 LM2_{t-1} + \lambda_4 LINT_{t-1} + \lambda_4 LUR_{t-1} + \varepsilon_t$$

The first part of the equation with $\alpha_{1,}$ βi , γ i and δ i represents the short-run dynamics of the model whereas the parameters λ1, λ2 , λ3 and λ4 represents the long-run relationship. The null hypothesis of the model is

H0: λ1 = λ2 = λ3 =λ4 =0 (there is no long-run relationship)

H1: λ1 ≠ λ2 ≠ λ3 ≠ λ4 ≠ 0

We start by conducting a bounds test for the null hypothesis of no cointegration. The calculated F-statistic is compared with the critical value tabulated by Pesaran (1997) and Pesaran et al. (2001). If the test statistics exceeds the upper critical value, the null hypothesis of a no long-run relationship can be rejected regardless of whether the under lying order of integration of the variables is 0 or1. Similarly, if the test statistic falls below a lower critical value, the null hypothesis is not rejected. However, if the test statistic falls between these two bounds, the result is inconclusive. When the order of integration of the variables is known and all the variables are *I(1)*, the decision is made based on the upper bound. Similarly, if all the variables are *I(0)*, then the decision is made based on the lower bound.

The ARDL methods estimates (p+1)k number of regressions in order to obtain the optimal lag length for each variable, where p is the maximum number of lags to be used and k is the number of variables in the equation.

In the second step, if there is evidence of a long-run relationship (cointegration) among the variables, the following long-run model is estimated,

$$LCONS_t = \theta_0 + \sum_{i=1}^{p1} \alpha_{1i} LNDI_{t-i} + \sum_{i=1}^{p2} \beta_{1i} LM2_{t-i} + \sum_{i=1}^{p3} \gamma_{1i} LINT_{t-i} + \sum_{i=1}^{p4} \delta_{1i} LUR_{t-i} + \varepsilon_t$$

If we find evidence of a long-run relationship, we then estimate the error correction model (ECM), which indicates the speed of adjustment back to long-run equilibrium after a short-run disturbance. The standard ECM involves estimating the following equation.

$$\Delta LCONS_t = \theta_0 + \sum_{i=1}^{p1} \alpha_{1i} \Delta LNDI_{t-i} + \sum_{i=1}^{p2} \beta_{1i} \Delta LM2_{t-i} + \sum_{i=1}^{p3} \gamma_{1i} \Delta LINT_{t-i} + \sum_{i=1}^{p4} \delta_{1i} \Delta LUR_{t-i} + \varepsilon_t$$

To ascertain the goodness of fit of the ARDL model, diagnostic and stability tests are conducted. The diagnostic test examines the serial correlation, functional form, normality, and hetroscedasticity associated with the model. The structural stability test is conducted by employing the cumulative residuals (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUMSQ).

The variables in this study, consumption (CONS), national disposable income (NDI), interest (INT) and unemployment rate (UR) are taken from International Financial Statistics database (IFS). Data on money supply (M2) is taken from various issues of the Pakistan Economic Survey. The data are annual and spans the time period 1971 to 2012.

Empirical Results

Table-1:Summary of Descriptive Statistics

	CONS	M2	INT	NDI	UR
Mean	6.569600	12.87660	10.77500	27.66612	4.953639
Median	6.477125	12.86275	10.00000	27.75484	4.300000
Maximum	9.377151	15.62738	20.00000	30.29458	8.300000
Minimum	3.656614	10.00148	5.000000	24.66199	3.100000
Std. Dev.	1.621484	1.718354	3.160148	1.544700	1.648910
Skewness	-0.059445	-0.103393	1.103500	-0.193259	0.662446
Kurtosis	1.971220	1.815877	4.069321	2.062756	2.149339
Jarque-Bera	1.787537	2.408180	10.02382	1.713039	4.131602
Probability	0.409111	0.299965	0.006658	0.424638	0.126717
Observation	43	43	43	43	43

Table 1 shows the summary statistics of all the variables, which shows that all the variables are normal distributed with mean, variance and covariance are constant over the period of time.

Table-2:Summary of Augmented Dicky-Fuller Test

Variable	First Difference		Order of Integration
	T-Statistics	p-value	
CONS	-5.535792	0.0003	I(1)
LNDI	-4.662723	0.0032	I(1)
LM2	-5.565483	0.0003	I(1)
LINT	-5.118415	0.0009	I(1)
LUR	-7.831116	0.0000	I(1)

Table 2 shows that on the bases of Augmented Dicky-Fuller test all the variable become stationary after taking their first difference. So, the order of integration is I(1).

Table-3: Summary of Optimal Lag Length

LAG	AIC	SBC
0	3.623374	3.666912
1	-2.603213	-2.516137
2	-2.638342	-2.507727

Table 3 shows that on the basis of AIC, SBC the optimal lag length is 2. So our final model of ARDL will be with 2 lags.

Table-4: Summary of Wald Test of Co-Integration

F-Statistics	3.364158	
Lower Bound	Critical Value at 10% Level of Significance	2.12
Upper Bound	Critical Value at 10% Level of Significance	3.23

As per table 4 our F-Statistics is greater than Upper bound. So, we reject the null Hypothesis of no co-integration and conclude that there is co-integration.

Result of Long Run Model

- 0.0617360761597*CONS(-1) - 0.0860133100981*LNDI(-1) + 0.131877547296*LM2(-1) + 0.0369766322543*LINT(-1) - 0.0228783945849*LUR(-1) =0

Normalizing for Cons

- 0.0617360761597*CONS(-1)= 0.0860133100981*LNDI(-1) - 0.131877547296*LM2(-1) - 0.0369766322543*LINT(-1) + 0.0228783945849*LUR(-1)

After Normalization, the result are presented in table 5.

Table-5: Summary of Long Run Coefficient

Variable	Coefficient	P-Value
Lndi	-1.3871	0.5755
Lm2	2.1274	0.2012
Lint	0.5963	0.4312
Lur	-0.3689	0.7747

The results of table 5 shows that lndi and lur are inversly related with consumption pattern while the lm2 and lint have positive association with consumption pattern. As the unemployment increases the consumption goes to decrease. The negative sign of lndi tells that like Christopher D. Carroll (1996) shows that the persons with high income spend less proportion instead of low income persons consume more according their income.

Table-6:Short Run Model

Variable	Coefficient	P-Value
Dlndi	-0.00000254	1.0000
dlm2	0.333634	0.1521
Dlint	0.023781	0.7640
Dlur	-0.070344	0.4305
Ect(-1)	-0.128145	0.6010

The results of table 5 indicate that the short run model is also supporting our long run result. The coefficient of error correction term is negative, which shows that the approximately 12 % error has been corrected every year and we are converging towards our long run equilibrium.

6. Conclusion

This paper attempted to estimate the consumption function for Pakistan in ARDL approach, to investigate the factors that determine consumption and for the purpose of forecasting consumption in the medium term.

The findings reveal the existence of a long run relationship between consumption, income, wealth, rate of interest and unemployment rate. Consumption elasticity obtained for wealth is 2.12 of the consumers in Pakistan are sensitive to changes in wealth and the unemployment has 36 percent negative impact on consumption, in the long run.

However, in the short run consumption is determined by the 2 lag difference in all variables. In the short run wealth is positively significant with the correct sign. In short run national disposable income is significant with consumption but has slightly negative impact on consumption in Pakistan. Moreover, consumption is more sensitive to contemporaneous wealth as indicated by a higher coefficient.

Furthermore, the study also finds that Pakistan's consumption adjusts to equilibrium levels quite fast. The result suggests that Pakistani's consumers adjust their consumption behavior quite early, probably as soon as they gain the slightest indications that the change in their wealth would be permanent. Because when they will not increase their consumption with disposable income then their wealth will goes to increase.

Finally, the result of the forecast evaluation suggests that the short run model constructed in this study has relatively good forecasting abilities and can produce a reliable forecast for Pakistan's private consumption in the medium term.

References

Blinder, A.R. and A. Deaton (1985). Time Series Consumption Function Revisited: Brookings paper on Economic Activity, 2, pp. 465-521.

Caglayan, Ebru (2012). A Microeconometric Analysis of Household Consumption Expenditure Determination for Both Rural and Urban, American International Journal of Contemporary Research, *Vol. 2 No. 2.*

Campbell, J. (1987). Does Savings Anticipated a Decline in Labor Income? Al alternative test of the permanent income hypothesis, Econometricia, 55(6), pp. 1249-1273.

Campbell, J. (1987). Permanent Income, Current Income and Consumption, Journal of Business and Economics 8, pp. 265-279.

Carroll. Christopher D. (1996). On the Concavity of the Consumption Function, Econometrica, (64)4, pp 981–992

Davidson, J. E. H. and D. F. Hendry (1981). Interpreting the Econometric Evidence: The Behaviour Consumer's Expenditure in United Kingdom, European Economic Review, 16, pp. 177-192.

Davidson, J. E. H. and D. F. Hendry., F. Srba. And S. Yeo (1978). Econometric Modeling of Aggregate Time Series Relationship between Consumers, Expenditure Income in United Kingdom, The Economic Journal, 88, pp. 661-692.

Davis, M. A. (1984). The Consumption Function in Macroeconomic Models: A comparative study, Applied Economics, 16, pp. 799-838.

Davis, M. A. and M. G. Palumbo (2001). A primer on the Economics and Time Series Econometrics of Wealth Effects, Federal Reserve Board Finance and Economic Discussion Paper No 2001-09

Flavin, M. (1981). The Adjustment of Consumption to Changing Expectations about future income, Journal of Political Economy, 89, (5) pp. 974-1009.

Friedman, M. (1957). A Theory of the Consumption Function, Princeton University Press, Princeton.

Goh, K. L. and R. Downing (2002). Modeling New Zealland Consumption Expenditure Over 1990s, New Zealand Treasury Working Paper 02/19.

Hall, R. E. (1978). Stochastic Implications of the Life Cycle Hypothesis: Theory and Evidence, Journal of Political Economy, 86, pp. 971-987.
Hendry, D. F. (1987). Econometric Methodology: A Personal Perspective, in T.F. Bewley (ed), Advances in Economics, 2, Cambridge University Press, pp. 29-48.
Kazmi, Aqdas ali, (1994). Private Consumption, Government Current Spending, Debt Neutrality: Resolving Kormendi Feldstein- Modegliani Modeling, The Pakistan Development Review.
Macklem, R. T. (1994). Wealth, Disposable Income and Consumption: Some Evidence from Canada, Bank of Canada, Technical Report No. 71.
Modigiliani, F. and R. Brumberg (1954). Utility Analysis and the the Consumption Function: An Interpretation of Cross- Section Data, In Post-Keynesian Economics, ed. K. Kurhira. New Brunswick, NJ: Rutger University Press.
Molana, H. (1990). The Time Series Consumption Function: Error Correction, Random walk and Steady State, Economic Journal, 101, pp. 382-402
Saad, Waheed, (2011). An Econometric Study of the Private Consumption Funtion in Labanon, International Research Journal of Finance and Economics.
Singh, Bimal (2004). Modelling Real Private Consumption Expenditure: An Empirical Study on Fiji, Reserve Bank of Fiji Working Paper.
Tan, A and G. Voss (2000). Consumption and Wealth, Reserve Bank of Australia Discussion Paper 2000-09
Zeldes, S. P. (1989). Consumption and Liquidity Constraints: An Empirical Investigation, Journal of Political Economy, 97, pp. 305-345

Appendix A Data Definition and Sources

Series	Definition and Sources
Real Private Consumption	Is defined as the sum of household outlays on consumer goods and services as in the National Accounts. Data source is the IFS 2011 issue.
National Disposable Income	Is defined as real private disposable income, Data source is Undata set.
Wealth	Quasi money is used as a proxy for wealth. M2 is used as quasi money. Data source is Economic Survey of Pakistan.
Real rate of interest	Is defined as the commercial bank weighted average lending rate. Data source is the IFS 2011 issue.
Unemployment rate	The persons who seek for job and are able to do job but can not find. Data source is the IFS 2011 issue.

APPENDIX B Diagnostic Tests
Overall model with lags.
Dependent Variable: DCONS
Method: Least Squares
Date: 27/08/12 Time: 19:45
Sample (adjusted): 1974 2012
Included observations: 39 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	11.84276	4.122489	2.872720	0.0086
CONS(-1)	0.053476	0.129778	0.412058	0.6841
LNDI(-1)	-0.697436	0.227897	-3.060310	0.0055
LM2(-1)	0.607924	0.178179	3.411875	0.0024
LINT(-1)	-0.074586	0.054884	-1.358974	0.1873
LUR(-1)	-0.279695	0.127969	-2.185640	0.0393
DLNDI(-1)	0.275307	0.207588	1.326219	0.1978
DLM2(-1)	-0.281133	0.237104	-1.185696	0.2478
DLINT(-1)	0.134887	0.082823	1.628627	0.1170
DLUR(-1)	0.246145	0.107896	2.281311	0.0321
DLNDI(-2)	0.341016	0.243122	1.402650	0.1741
DLM2(-2)	-0.089761	0.168140	-0.533844	0.5986
DLINT(-2)	-0.061047	0.094939	-0.643015	0.5266
DLUR(-2)	0.105854	0.105166	1.006542	0.3246

R-squared	0.556416	Mean dependent var	0.147631
Adjusted R-squared	0.305695	S.D. dependent var	0.063931
S.E. of regression	0.053270	Akaike info criterion	-2.745535
Sum squared resid	0.065268	Schwarz criterion	-2.135999
Log likelihood	64.79240	Hannan-Quinn criter.	-2.530645
F-statistic	2.219263	Durbin-Watson stat	2.162991
Prob(F-statistic)	0.045836		

Wald Test:
Equation: EQ02

Test Statistic	Value	df	Probability
F-statistic	3.364158	(4, 23)	0.0263
Chi-square	13.45663	4	0.0092

Null Hypothesis: C(3)=0,C(4)=0,C(5)=0,C(6)=0
Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
C(3)	-0.697436	0.227897
C(4)	0.607924	0.178179
C(5)	-0.074586	0.054884
C(6)	-0.279695	0.127969

Restrictions are linear in coefficients.

We calculate the wald test. Here F.test is greater than pesaren critical value at 10%.

Dependent Variable: DCONS
Method: Least Squares
Date: 27/08/14 Time: 19:30
Sample (adjusted): 1975 2012
Included observations: 38 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	15.32927	4.672518	3.280729	0.0042
CONS(-1)	0.137826	0.142810	0.965104	0.3473
LNDI(-1)	-0.907933	0.264884	-3.427661	0.0030
LM2(-1)	0.749538	0.225858	3.318630	0.0038
LINT(-1)	-0.005911	0.060578	-0.097584	0.9233
LUR(-1)	-0.458596	0.147297	-3.113416	0.0060
DLNDI(-1)	0.362863	0.207877	1.745564	0.0979
DLM2(-1)	-0.405256	0.231455	-1.750903	0.0970
DLINT(-1)	0.089731	0.102182	0.878147	0.3914
DLUR(-1)	0.290949	0.110279	2.638306	0.0167
DLNDI(-2)	0.425414	0.244771	1.738010	0.0993
DLM2(-2)	0.089937	0.253975	0.354119	0.7274
DLINT(-2)	-0.068862	0.087467	-0.787287	0.4414
DLUR(-2)	0.160081	0.121379	1.318852	0.2038
DLNDI(-3)	0.665594	0.233545	2.849961	0.0106
DLM2(-3)	-0.342054	0.162292	-2.107649	0.0493
DLINT(-3)	-0.221957	0.110491	-2.008825	0.0598
DLUR(-3)	0.135534	0.113160	1.197726	0.2466

R-squared	0.639140	Mean dependent var	0.142486
Adjusted R-squared	0.298327	S.D. dependent var	0.056541
S.E. of regression	0.047362	Akaike info criterion	-2.955136
Sum squared resid	0.040377	Schwarz criterion	-2.163376
Log likelihood	71.19245	Hannan-Quinn criter.	-2.678791
F-statistic	1.875341	Durbin-Watson stat	2.397210
Prob(F-statistic)	0.097818		

Now we calculate long run model.

Dependent Variable: DCONS
Method: Least Squares
Date: 27/08/14 Time: 22:51
Sample (adjusted): 1972 2012
Included observations: 41 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.181932	2.988897	0.395441	0.6951
CONS(-1)	-0.061736	0.130517	-0.473013	0.6393
LNDI(-1)	-0.086013	0.152069	-0.565620	0.5755
LM2(-1)	0.131878	0.101123	1.304136	0.2012
LINT(-1)	0.036977	0.046397	0.796958	0.4312
LUR(-1)	-0.022878	0.079291	-0.288538	0.7747

R-squared	0.072982	Mean dependent var	0.146680
Adjusted R-squared	-0.067475	S.D. dependent var	0.064943
S.E. of regression	0.067099	Akaike info criterion	-2.424665
Sum squared resid	0.148574	Schwarz criterion	-2.168732
Log likelihood	53.28097	Hannan-Quinn criter.	-2.332839
F-statistic	0.519605	Durbin-Watson stat	1.398496
Prob(F-statistic)	0.759563		

Now generate the ect (Error correction term).
Now we run the short run model with ect(-1)

Dependent Variable: DCONS
Method: Least Squares
Date: 27/08/12 Time: 20:18
Sample (adjusted): 1975 2012
Included observations: 38 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.079526	0.088184	0.901818	0.3758
CONS(-1)	0.003244	0.007803	0.415760	0.6811
DLNDI(-1)	-0.003895	0.193705	-0.020109	0.9841
DLM2(-1)	-0.071417	0.207465	-0.344236	0.7335
DLINT(-1)	0.114473	0.085637	1.336720	0.1934
DLUR(-1)	0.071856	0.081045	0.886617	0.3837
DLNDI(-2)	-2.54E-06	0.217670	-1.17E-05	1.0000
DLM2(-2)	0.333634	0.225835	1.477333	0.1521
DLINT(-2)	0.023781	0.078364	0.303466	0.7640
DLUR(-2)	-0.070344	0.087782	-0.801345	0.4305
ECT(-1)	-0.128145	0.241897	-0.529753	0.6010

R-squared	0.281647	Mean dependent var	0.142486
Adjusted R-squared	-0.005694	S.D. dependent var	0.056541
S.E. of regression	0.056702	Akaike info criterion	-2.655555
Sum squared resid	0.080377	Schwarz criterion	-2.171702
Log likelihood	58.79998	Hannan-Quinn criter.	-2.486677
F-statistic	0.980183	Durbin-Watson stat	1.769917
Prob(F-statistic)	0.484415		