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The Effect of Economic Variables on National Saving of Pakistan

MUHAMMAD REHAN
MUHAMMAD KAMRAN KHAN
ARSHAD ULLAH JADOON
School of Economics and Management
Northeast Normal University, Changchun Jilin, China

Abstract:

This paper has empirically explored the effect of economic variables on national saving of Pakistan by applying quarterly time series data from 1995Q1 to 2018Q4. All the data used in this study have duly obtained from the website of World Bank database. In this study we used ARDL model and according to the analysed results of ARDL money supply growth have negative while gross domestic product, and per capita income have positive but significant effect on national saving of Pakistan in long-run. Inflation has negative and non-significant effect on national saving in both in the long-run and short-run in Pakistan.

Keywords: National saving, money supply growth, gross domestic product, income per capita, Inflation, ARDL

I. INTRODUCTION

National saving is determined by the behavior of governments, firms and households which may be influenced in different ways by changing socioeconomic and demographic factors. The main sector of a national economy that saves is the household sector, which saving behavior has been studied most extensively. The households' saving behavior is determined by a complex of economic, demographic, social, and cultural factors. The significance of saving in economic growth

has been highlighted in various theories of economic growth. Harrod-Domar model of economic growth emphasizes the crucial role of saving in economic growth. Even if capital flows provided from international markets are among the significant factors to finance countries' investments, domestic saving are the most determining factor in the high rate of investment (Ozcan et al., 2003). Therefore, a close monitoring of the domestic saving rate in the economy and ascertaining the determinants of this ratio have great importance for economic institutions.

The neoclassical growth model by Solow (1956) discusses the role of saving in determining the higher growth rates of per capita income and capital per capita. Later on endogenous growth theories also discuss the role of saving. Romer (1986) explains that economic growth depends upon technological changes, human capital and aggregate saving and if less developed countries have desire for achieving high economic growth rates they must save and invest a higher fraction of Gross Domestic Product (GDP). A number of empirical studies are available in the literatures which are consistent with these theories. Comparative analysis of saving has revealed that most of the emerging economies like China, India, Indonesia, Malaysia, Singapore, South Korea, and Thailand have high saving rates. Similarly, many sub-Saharan African and some of the Latin American countries save less and as a result, these countries have experienced low levels of economic growth. This indicates that the exploration of the determinants of saving in an economy is highly important for policy makers to formulate and implement relevant policies for increasing saving and economic growth. There are four main factors that affect the domestic saving in any country. The first of them is demographic factors, including dependency ratios, life expectancy, etc. (Hussain and Brookins, 2001). Another one is sociocultural factors such as saving culture, traditions, values and norms (Waheed, 2002).Women's participation in the labour force, the development level of the social security system and the financial market are also considered as structural factors which have an impact on domestic saving (Brenner et al., 1994; Edwards, 1995). The last one is the economic factors, such as the gross domestic product (GDP), per capita income, money supply growth and the inflation rate, which are to be investigated in this study. Previous theoretical and experimental

studies on the factors of saving have revealed many macroeconomic indicators in relation to saving.

The main objective of this paper is to empirically investigate the effect of economic variables on national saving of Pakistan. Several researches are present in the economics literature on the causal long and short-run relationship between the elements which affect the saving of people in Pakistan, but most of these studies suffer from defects due to the short span of data, poor estimation techniques and the selection of irrelevant variables in the model. In this situation, it is difficult to point out the exact factors responsible for low saving rate in Pakistan. This study is an attempt to bridge the research gap by analyzing the long-run and the short-run causal relationship between economic factors and saving in Pakistan. This study is of great importance as it analyses the relationship between the variables using the latest econometric techniques, appropriate selection of time span and the use of relevant variables in the estimation of the model. Findings of this study may be helpful to researchers and policy makers in designing policies needed for removing the bottlenecks in the way of increasing the saving rate in Pakistan.

1.1 The Model

Romer (2012) presented the permanent income model starts from the classical utility theory that individuals maximize utility by allocating their lifetime resources optimally between current and future consumptions according to their lifetime budget constraint. Consider the lifetime utility function of an individual who lives for T periods:

$$Ut = \sum_{t=1}^{t} u(Ct)$$

where **u** is the utility function with positive first derivative and negative second derivative; Ct is consumption at period t. Furthermore, the individual starts with initial wealth Ao and earns labor incomes of Yt for period T=t in his or her life. The interest rate is assumed to be at zero for simplicity. Therefore, the individual's lifetime budget constraint is:

$$\sum_{t=1}^{t} Ct \leq Ao + \sum_{t=1}^{t} Yt$$

Since the individual is assumed to have positive marginal utility, he or she will maximize utility through maximizing consumption by satisfying the budget constraint with equality. To solve for the optimal Ct, the individual uses the following Lagrangian equation:

$$L = \sum_{t=1}^{t} u(Ct) + \lambda \left(Ao + \sum_{t=1}^{t} Yt - \sum_{t=1}^{t} Ct \right)$$

The first-order condition for Ct is $u'(Ct) + \lambda$, which holds for all t. Thus, the marginal utility of consumption is constant in every period. Since marginal utility is uniquely determined by consumption, consumption must be constant in every period as well. Plugging this result into the budget constraint yields:

$$Ct = \frac{1}{t}\left(Ao + \sum_{t=1}^{t} Yt \right)$$

which holds at every period. Hence, the model shows that an individual's consumption in a given period is not determined by the income of that period, but the lifetime income, also known as permanent income. Therefore, transitory income, the difference between current and permanent income, has little effect on current consumption, since temporary deviation of current income from the long term income will have little impact in the individual's lifetime earning profile.

Although the time pattern of income is not important to consumption, it is important to save, as shown by the following:

$$St = Yt - Ct$$

$$St = \left(Yt - \frac{1}{t}\sum_{t=1}^{t} Yt \right) - \frac{1}{t} Ao$$

where the second equation is obtained by substituting the consumption equation from above. In this case, transitory income will result in higher saving. Thus, the individual uses saving and borrowing to smooth out consumption fluctuations from period to period and to achieve stable consumption pattern. The permanent income model and various other theories of consumption demonstrate

a positive correlation between individual's saving and income, but endogeneity still remains a problem. On one hand, the classical Solow Growth Model predicts that although income growth in the long run is only driven by the exogenous technological progress, in the short run, saving determines capital accumulation, which in turn determines the rate of economic growth. On the other hand, the life-cycle model predicts a causal relationship from income growth to the saving rate - that is, higher growth leads to greater household saving.

The rest of this paper is structured as follows. Section 2 provides brief literature of previous studies. Section 3 provides data and methodology. Section 4 provides results and discussion, and conclusion in section 5.

II. LITERATURE REVIEW

Previously many researchers of the world have worked on this topic however, the previous work is different in term of econometric method, data selection, variables selection, and geographical location. Several studies are available in the literature which have thrown light on the relationship between economic variables and their effect on national savings. Some of previous studies have discussed as follows.

Previously, Ahmad and Mahmood (2013) have investigated the factors that determine the national saving in the course of economic progress. They used time series data and applied (ARDL) bounds testing method for estimation purposes. The study finds that per capita income has an inverse relation with saving. They pointed out that Keynesian and the permanent income hypothesis do not hold in Pakistan. Exchange rate and inflation are found to be negatively related to national saving. Trade openness has a positive impact on national saving because trade openness enhances the welfare level. It has also observed that an increase in money supply increases national saving through the seigniorage effect in Pakistan. Ahmed (2011) analyzed empirically the determinants of domestic saving in a number of African countries using variables such as per capita income, interest rate on deposits and the age dependency ratio. He established from the results that African domestic saving were positively correlated with income and negatively correlated with commercial bank deposit rate and the age dependency ratio. Ahmad and Marwan

(2003) examined empirically the determinants of gross saving rate using the Johansen co-integration and error-correction model for the period 1960-2000. They used variables like export rate, interest rate, foreign direct investment, tax rate, dependency ratio and economic growth and found that in the long run, the saving rate was measured by the investigated elements. Moreover, short run error-correction model shows that, the saving rate is also determined by tax rate and growth of exports. Dan (2014) revealed that both changes in the inflation rate and saving levels around the globe considerably affect the decision making of economic agents (both individuals and institutions) and are arguably considered as major policy variables in macroeconomics. Various factors have influence on saving rate and one of them is inflation. Theoretical and empirical studies have mixed results on the relationship between these two variables and therefore provide a fruitful area for further research for developing countries such as Kenya. He assessed the correlation between these two variables and whether inflation variability has a significant influence and therefore can be a threat to the growth, development and survival of saving and Credit Cooperative Societies in Kenya. He used descriptive analysis, correlation analysis, and regression analysis. He concluded that there is a negative relationship between inflation and saving levels in SACCOs and that this relationship is insignificant ($p>0.05$). His results further showed that the dividend rate paid out to members of their saving has positive relations with the saving level. He indicated that moving from informal to formal SACCO would increase the saving and vice versa. With a p- value of 0.011, this relationship is significant and affects the saving model. Lastly, the age of SACCO had a positive relation with saving as a unit increase in the age of SACCOs would significantly increase the saving with a p-value of less than 0.05

Asghar and Nadeem (2016) studied determinants of national of Pakistan for the period 1984-2014 by applying Johansen cointegration and a Vector Error Correction Model (VECM). They pointed out that indicates that there is a bidirectional causality between income inequality and foreign remittances, income inequality and population size, government stability and population size, saving and income inequality. There is unidirectional causality between the variables included in the model: saving and economic stability, saving and population, saving and government stability, population size and

economic stability, government stability and foreign remittances, foreign remittances and saving except between economic stability and foreign remittances, and between economic stability and income inequality. Mohan (2006) examined the trend of causality and impact between economic growth and domestic saving for a number of countries with different levels of income and economic growth. The results revealed that the trend of causality runs from economic growth in domestic saving. Also, income level in a country is found to play a significant role in determining the trend of causality between economic growth and domestic saving. Dhiman and Verma (2016) revealed that the national economy has grown with the initiatives taken for the development of all sectors by the Government. Consequently, the Gross Development Product has been influenced due to the daring initiatives of the Government. They predicted that the process of development is not complete till it leads to the growth in the Gross Domestic and consequently the household saving. Obviously, Gross Domestic Product and the Gross Domestic Saving are the deciding factors of the overall development of the nation. They analysed correlation between GDP and GDS. Kazmi (1993) reported that inflation and saving have a two-way relationship with different signs, in one way it has negative relationship and on the other hand it has a positive relationship. For example, a rise in the price of the commodities indicates households would spend more on buying commodities; as a result, household's saving decreases. In this case we have an adverse relationship (negative) between National Saving and inflation. Macroeconomic certainty was created by inflation. The relation between saving and inflation has two different aspects and indicates two signs. According to consumers' perception due to increase in prices of commodities, the rate of domestic saving showed downward trend because individuals spend more on buying commodities and products which indicated that there was significant and negatively relation among domestic saving and inflation which in turn, directly affect rates of National Saving. According to Producers' perception, producers charge high prices for consumers due to which prices of commodities increase and manufacturer or producers earn more which shows a positive link between saving and inflation.

Grigoli et al. (2014) used panel data for 165 countries from 1981 to 2012 pointed out the positive effect of income and macroeconomic uncertainty on private saving, where uncertainty is associated with

precautionary saving. Public saving had a negative, but small effect on household saving, while corporate saving had a larger negative effect. Carrol and Weil (1994) revealed that an increase in per capita income has led to a rise saving rate. Incomes have generated saving. High saving depends directly on enhanced income in a situation of reduced or consistent expenses. Loayza et al. (2000) concluded that saving and inflation rate have positive and significant relation. The rate of saving of different countries was mostly influenced due to changes or variation in consumption and income of the government. When expenditures or consumptions of the government were more than income or revenue of the government, it has caused fiscal deficit. The influence of surplus or fiscal deficit on national saving was more common in developing countries. They concluded that saving of government have played the main part in decreasing fiscal deficit and economic policies are designed accordingly.

III. METHODOLOGY

This paper has empirically explored the effect of economic variables on national saving of Pakistan by applying quarterly time series data from 1995Q1 to 2018Q4. All the data used in this study have duly obtained from the website of World Bank database. In this study we used ARDL model and according to the analysed results of ARDL money supply growth have negative while gross domestic product, and per capita income have positive but significant effect on national saving of Pakistan in long-run. Inflation have negative and non-significant effect on national saving in both in the long-run and short-run in Pakistan. Different econometric techniques are used for testing the presence of long-run equilibrium relationship among time-series variables. Most popular econometric techniques applied for causal analysis are Engle and Granger (1987) causality test, fully Ordinary least square procedure of Phillips and Hansen's (1990), maximum likelihood proposed by Johansen (1988, 1991) which depend on variables in the regression equations that variables are of order i.e. level I (0) or first difference I (1). However, some methods are not suitable for small sample characteristics and affect from low power, ARDL model is an alternative choice. In ARDL model, stationarity of data is less important, the researcher need not worry about the variables of research study that variables are stationary at I (0) or I

(I) or both of them. A new technique called autoregressive distributed lag (ARDL) approach to cointegration suggested by Pesaran and Shin (1999), Pesaran et al. 2001 is widely used in recent years. Justification for use Autoregressive distributed lag (ARDL) econometric technique in current research paper is that ARDL is easy of carrying out. Furthermore, ARDL can estimate both the long-run relationship and conduct short run causality analysis. Long run ARDL models are as follow.

$$\Delta NS_t = \alpha + \sum_{i=1}^{n-1} \alpha_{1i}\Delta NS_{t-1} + \sum_{i=1}^{n-1} \alpha_{2i}\Delta GDP_{t-1} + \sum_{i=1}^{n-1} \alpha_{3i}\Delta INF_{t-1} + \sum_{i=1}^{n-1} \alpha_{4i}\Delta MSG_{t-1} + \sum_{i=1}^{n-1} \alpha_{5i}\Delta PCI_{t-1} + \beta_6 NS_{t-1} + \beta_7 GDP_{t-1} + \beta_8 INF_{t-1} + \beta_9 MGS_{t-1} + \beta_{10} PCI_{t-1} + \mu_t \quad 1.1$$

$$\Delta GDP_t = \alpha + \sum_{i=1}^{n-1} \alpha_{1i}\Delta GDP_{t-1} + \sum_{i=1}^{n-1} \alpha_{2i}\Delta NS_{t-1} + \sum_{i=1}^{n-1} \alpha_{3i}\Delta INF_{t-1} + \sum_{i=1}^{n-1} \alpha_{4i}\Delta MSG_{t-1} + \sum_{i=1}^{n-1} \alpha_{5i}\Delta PCI_{t-1} + \beta_6 GDP_{t-1} + \beta_7 NS_{t-1} + \beta_8 INF_{t-1} + \beta_9 MGS_{t-1} + \beta_{10} PCI_{t-1} + \mu_t \quad 1.2$$

$$\Delta INF_t = \alpha + \sum_{i=1}^{n-1} \alpha_{1i}\Delta INF_{t-1} + \sum_{i=1}^{n-1} \alpha_{2i}\Delta GDP_{t-1} + \sum_{i=1}^{n-1} \alpha_{3i}\Delta NS_{t-1} + \sum_{i=1}^{n-1} \alpha_{4i}\Delta MSG_{t-1} + \sum_{i=1}^{n-1} \alpha_{5i}\Delta PCI_{t-1} + \beta_6 INF_{t-1} + \beta_7 GDP_{t-1} + \beta_8 NS_{t-1} + + \beta_9 MGS_{t-1} + \beta_{10} PCI_{t-1} + \mu_t \quad 1.3$$

$$\Delta MSG_t = \alpha + \sum_{i=1}^{n-1} \alpha_{1i} \Delta MSG_{t-1} + \sum_{i=1}^{n-1} \alpha_{2i} \Delta GDP_{t-1} + \sum_{i=1}^{n-1} \alpha_{3i} \Delta INF_{t-1} + \sum_{i=1}^{n-1} \alpha_{4i} \Delta NS_{t-1} + \sum_{i=1}^{n-1} \alpha_{5i} \Delta PCI_{t-1} + \beta_6 MGS_{t-1} + \beta_7 INF_{t-1} + \beta_8 GDP_{t-1} + \beta_9 NS_{t-1} + \beta_{10} PCI_{t-1} + \mu_t \quad 1.4$$

$$\Delta PCI_t = \alpha + \sum_{i=1}^{n-1} \alpha_{1i} \Delta PCI_{t-1} + \sum_{i=1}^{n-1} \alpha_{2i} \Delta GDP_{t-1} + \sum_{i=1}^{n-1} \alpha_{3i} \Delta INF_{t-1} + \sum_{i=1}^{n-1} \alpha_{4i} \Delta MSG_{t-1} + \sum_{i=1}^{n-1} \alpha_{5i} \Delta NS_{t-1} + \beta_6 PCI_{t-1} + \beta_7 MGS_{t-1} + \beta_8 INF_{t-1} + \beta_9 GDP_{t-1} + \beta_{10} NS_{t-1} + \mu_t \quad 1.5$$

In the above equations from 1.1 to 1.5, NS is national saving, GDP is gross domestic product, INF is inflation, PCI is per capita income and MGS is money supply growth, Δ represents first difference of variable and α0 is the deterministic constant. Long run co-integration relationship among National saving, Gross Domestic Product, Inflation, Money Growth Supply and Per Capita Income, Ho: $\alpha 1 = \alpha 2 = \alpha 3 = \alpha 4 = \alpha 5 = 0$; Ha: $\alpha 1 \neq \alpha 2 \neq \alpha 3 \neq \alpha 4 \neq \alpha 5 \neq 0$, the procedures proposed by Pesaran et al. (2001) for small samples. If the null hypothesis of no co-integration is rejected in Models statistically, following the procedure of Pesaran et al. (2001), after having long run relationship among variables, we need to run short run coefficients. The ARDL version of the unrestricted ECT is derived as follows.

$$\Delta NS_t = \alpha + \sum_{i=1}^{n-1} \alpha_{1i} \Delta NS_{t-1} + \sum_{i=1}^{n-1} \alpha_{2i} \Delta GDP_{t-1} + \sum_{i=1}^{n-1} \alpha_{3i} \Delta INF_{t-1} + \sum_{i=1}^{n-1} \alpha_{4i} \Delta MSG_{t-1} + \sum_{i=1}^{n-1} \alpha_{5i} \Delta PCI_{t-1} + \eta 1 ECT_{t-1} + \mu_t \quad 1.6$$

$$\Delta GDP_t = \alpha + \sum_{i=1}^{n-1} \alpha_{1i} \Delta GDP_{t-1} + \sum_{i=1}^{n-1} \alpha_{2i} \Delta NS_{t-1} + \sum_{i=1}^{n-1} \alpha_{3i} \Delta INF_{t-1} + \sum_{i=1}^{n-1} \alpha_{4i} \Delta MSG_{t-1} + \sum_{i=1}^{n-1} \alpha_{5i} \Delta PCI_{t-1} + \eta 2 ECT_{t-1} + \mu_t \quad 1.7$$

$$\Delta INF_t = \alpha + \sum_{i=1}^{n-1} \alpha_{1i} \Delta INF_{t-1} + \sum_{i=1}^{n-1} \alpha_{2i} \Delta GDP_{t-1} + \sum_{i=1}^{n-1} \alpha_{3i} \Delta NS_{t-1} + \sum_{i=1}^{n-1} \alpha_{4i} \Delta MSG_{t-1} + \sum_{i=1}^{n-1} \alpha_{5i} \Delta PCI_{t-1} + \eta 3 ECT_{t-1} + \mu_t \quad 1.8$$

$$\Delta MSG_t = \alpha + \sum_{i=1}^{n-1} \alpha_{1i}\Delta MSG_{t-1} + \sum_{i=1}^{n-1} \alpha_{2i}\Delta GDP_{t-1} + \sum_{i=1}^{n-1} \alpha_{3i}\Delta INF_{t-1} + \sum_{i=1}^{n-1} \alpha_{4i}\Delta NS_{t-1} + \sum_{i=1}^{n-1} \alpha_{5i}\Delta PCI_{t-1} + \eta 4ECT_{t-1} + \mu_t \quad 1.9$$

$$\Delta PCI_t = \alpha + \sum_{i=1}^{n-1} \alpha_{1i}\Delta PCI_{t-1} + \sum_{i=1}^{n-1} \alpha_{2i}\Delta GDP_{t-1} + \sum_{i=1}^{n-1} \alpha_{3i}\Delta INF_{t-1} + \sum_{i=1}^{n-1} \alpha_{4i}\Delta MSG_{t-1} + \sum_{i=1}^{n-1} \alpha_{5i}\Delta NS_{t-1} + \eta 5ECT_{t-1} + \mu_t \quad 1.10$$

Here in the above equation from 1.6 to 1.10 η describe the speed of adjustment parameter and ECT is the residuals from the estimated long-run relationship in model (1.1 to 1.5) Alkhathlan, 2013; Jalil et al., 2013. Quarterly data from 1995Q1 to 2018Q4 covering 96 observations for all variables National Saving, Gross Domestic Product, Inflation, Money Supply Growth and Per Capita Income from world Banks Statistics for Pakistan are selected for this empirical study.

IV. RESULTS AND DISCUSSIONS

Table 1: Unit Root Test

	ADF		**Phillips-Perron**	
Level				
Variables	**Intercept**	**Trend & Intercept**	**Intercept**	**Trend & Intercept**
NS	-0.5424	-1.5689	-0.595	-2.6543
GDP	-3.3380**	-3.3480**	-2.3538	-2.3447
INF	-2.1019	-2.1147	-1.8052	-1.7706
MSG	-3.3584**	-3.3300*	-2.5695	-2.7754
PCI	0.4209	-1.7937	1.6515	-0.9648
First Difference				

NS	-3.6928**	-3.6865**	-4.7465***	-4.6566***
GDP	-3.3380**	-3.3480**	-4.2436***	-4.2300**
INF	-3.0585**	-3.0384**	-4.4989***	-4.4673**
MSG	-3.3584**	-3.8526**	-4.4656***	-4.4402**
PCI	-3.1043 **	-3.3868**	-3.3770**	-3.7143*

***, **, * indicate statistical significance at 1%, 5% and 10% respectively. NS is national saving, GDP is gross domestic product, INF is inflation, MSG is money supply growth and PCI is per capita income.

ADF and PP test were applied for checking the stationarity of data. Stationary of data were checked through ADF and PP test with intercept and intercept and trend since application of ARDL bounds testing requires that all variables should be integrated at purely order I(0), purely I(I) or mutually co-integrated, otherwise, the calculation of the F-statistic of ARDL becomes invalid (Baum, 2004). Results of ADF and PP indicated that National saving, Inflation and per capita income are not stationary at level but at first difference. However, Gross Domestic Product and money supply are stationary at level.

Table 2: The ARDL Lag Determination

Selection criteria of lag order of variables for the ARDL approach

Lag	**LogL**	**LR**	**FPE**	**AIC**	**SC**	**HQ**
0	-1382.3170	NA	33955498	31.5299	31.6707	31.5866
1	-663.9651	1338.7480	4.8725	15.7719	16.6165	16.1122
2	-522.9221	246.8252*	0.3505*	13.1346*	14.6829*	13.7584*
3	-517.9225	8.1812	0.5600	13.5891	15.8413	14.4965
4	-502.8632	22.9312	0.7208	13.8151	16.7709	15.0059

Lag of 2 is selected for all information criteria for the ARDL approach to co-integration. We have selected Schwarz information criterion for our analysis.

Table 3: ARDL Bounds Test

Null Hypothesis: No long-run relationships exist

Test Statistic	**Value**	**Significance Level**	**I(0) Bound**	**I(1) Bound**
F-statistic	7.4731	10%	2.45	3.52
		5%	2.86	4.01
		2.5%	3.25	4.49
		1%	3.74	5.06

The above table showed the results of ARDL bound test. Null hypothesis of no long run relationships among the dependent and independent variables while that alternative hypothesis is that there

does exist. Results of our estimated ARDL bound test show that value of F-statistics is higher than the upper bound that shows that there is long run relationship among the dependent and independent variables. If the F-statistics value is less than the value of lower bound then null hypothesis of no long relationship is not rejected, and if the F statistics lies among the lower and upper bound then the result is in-decidable.

Table 4: Long Run Coefficient Dependent Variable: National Saving Selected Model: ARDL (1,0,0,1,0) Based on Schwarz Bayesian Criterion

Regressors	**Coefficient**	**T-Ratio**
Constant	0.6264	4.5971
GDP	2.4658	4.8715
PCI	0. 0344	4.1879
INF	-0. 0264	-0.2415
MSG	-0. 2663	-2.2838
R-Squared	0.9576	
Adjusted R-Squared	0.9245	
Akaike Info. Criterion	-42.6053	
Schwarz Bayesian Criterion	-52.6487	
DW-statistic	2.0126	

***, **, * indicate statistical significance at 1%, 5% and 10% respectively. NS is national saving, GDP is gross domestic product, INF is inflation, MSG is money supply growth and PCI is per capita income.

The above table indicates the results of long run ARDL model. National saving is used as dependent variable while gross domestic product, inflation and money supply growth are independent variables. Coefficient of Gross domestic product showed positive and statistically significant impact on saving. The examined results indicate that 1 % increase in gross domestic product positively affect the saving behavior of people in Pakistan. The examined results of gross domestic product are same with previous researchers. For example, Samuel (2005) conducted research on determinants of aggregate domestic private saving in Kenya from 1980-2003 by applying demographic variables, such as young and old age dependency ratios, different measures/indicators of financial sector development, e.g. the ratio of M2 money to GDP, the ratio of liquid liabilities to GDP, and the ratio of the assets of commercial banks to the assets of central banks as new variables, which previously not

used in any study on Kenya. Controlling variables like income tax, deposit rate used at the central bank, current account deficit, interest rate spread, terms of trade, inflation rate and real gross disposable per capita income. Per Capita Income is also statistically significant in the long run with national saving. Coefficient of income showed positive effects on national saving. Modigliani et al. (2013) revealed that fiscal policy and inflation are the main factors that influences on national saving. They analyze the impact fiscal policy and inflation on national saving. They pointed that government deficits reduce in national saving. They pointed that the impact of inflation are not definite, and no conclusion is drawn. Friedman (1957) predicts that the impact of income shocks on consumer—i.e., saving—depends on whether the shocks are temporary or permanent. Although temporary positive shocks to income would lead merely to an increase in saving, but no change in consumption, permanent shocks might lead to an increase in consumption, that is, a decrease in saving. Coefficient of Inflation is negative and statistically insignificant in the long run, which implied that the inflation is not an important factor in determining of national saving. In general phenomena when inflation is increasing so income is decreasing because of high prices of commodities in the local market due to which saving of ordinary people goes down. Sahin (2016) conducted research on determinant of saving in china for the period of 1980-2013 by applying ARDL Model. He pointed out that inflation has negative impact on saving in China. Loayza et al. (2000) concluded that inflation and saving have a positive relationship. They pointed out the positive effect of the rate of interest on domestic saving. Different published research reported sensitivity of saving rate to interest rate for the purpose of income levels. The examined results of money supply growth indicate negative and significant effect on saving in Pakistan; the results of money supply stimulate the saving decrease because when money supply increases so economy faces inflation. The most appropriate economic variable is financial depth measured by the degree of monetization of the economy captured by the ratio of broad money (M2) to national output (GDP) (Ozcan et al., 2003). The range and availability of money that suit savers interest, expansion of bank branches and improvement in the accessibility to banking facilities motivates individuals to save more; However, saving can be discouraged by the availability of more credit as availability of more

credit relaxes domestic liquidity constraints, particularly credit given for consumption (Loayz et al., 2000). Second part of table 4 shows result of the diagnostic statistics. R square showed that 95 percent variation in dependent variable i.e. national saving is explained by gross domestic product, inflation, per capita income and money supply growth while the remaining five percent variation is due to other external factors that are not included in our study but that factors effect national saving. Akaike Information Criterion and Schwarz Bayesian Criterion value is respectively -42.6053 and -52.6487 that showed that our ARDL model is fit. DW-statistics value is 2.0126 that show that there is no autocorrelation problem in data.

Table 5: Short Run Coefficient for the Selected ARDL (1,0,0,1,0) Selected based on Schwarz Bayesian Criterion

Regressors	**Coefficient**	**T-Ratio**
GDP	0.3407***	7.2984
INF	-0.0036	-0.2410
MSG	0.1002***	3.8444
PCI	0.0047*	5.5914
ECT(-1)	-0. 1382***	
R-Squared	0.5486	
Adjusted R -Squared	0.5105	
Akaike Info. Criterion	-42.6053	
Schwarz Bayesian Criterion	-52.6487	
DW-statistic	2.0127	

***, **, * indicate statistical significance at 1%, 5% and 10% respectively. NS is national saving, GDP is gross domestic product, INF is inflation, MSG is money supply growth and PCI is per capita income.

The above table presents results of the estimated ARDL short-run error correction model. The coefficients of gross domestic product, Money supply growth and per capital income are positive and significant while the coefficient of Inflation is negative but statistically insignificant. ECT model confirms the results of the long run ARDL model. DGDP coefficient shows that a one percent increases in gross domestic product increase saving up to 0.3407 percent. Coefficient of inflation value showed that a one percent increase in inflation caused to decrease 0.0036 percent saving in Pakistan. Money supply growth coefficient also showed that a one percent increase in money supply growth in the economy increases the

saving rate in Pakistan up to 0.1002 percent. Per capita income coefficient shows that a one percent increase will increase saving in Pakistan up to 0.0047 percent.

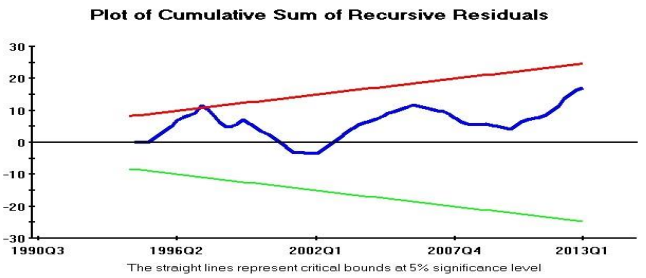
The ECT (−1) results show negative and significant sign. A negative sign of ECT confirmed the cointegration relationship based on the ARDL model. ECT shows that roughly 14% correction to the disequilibrium in the national saving from long run relationship past shocks every year. ECT indicated that the speed of adjustment is normal.

Table 6: Serial Correlation LM Test and Heteroskedasticity Test:

Breusch-Godfrey Serial Correlation LM Test			
F-statistic	1.2956	Prob. F(2,74)	0.2799
Obs*R-squared	2.9771	Prob. x^2 (2)	0.2257
Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	0.9173	Prob. F(30,55)	0.5928
Obs*R-squared	28.6791	Prob. x^2 (30)	0.5345

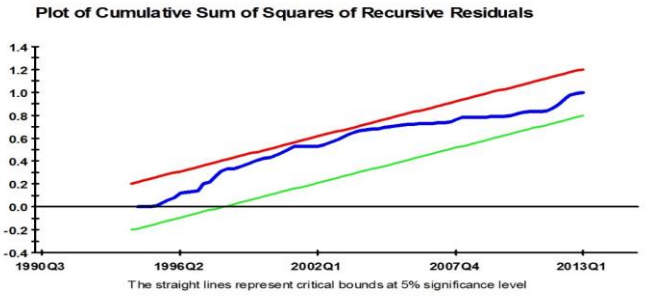
Breusch Godfrey serial correlation LM tests shows that no serial correlation problem exists with the model. Breusch Pagan Godfrey test for checking Heteroskedasticity shows that P value is higher than 0.05, which means that Heteroskedasticity has been removed.

Figure 1



Stability of ARDL model has checked the through CUSUM Test. The result of CUSUM test shows that blue line is between the two red line and green line, which show that our model is stable. If the blue line crosses any one of the two lines, then our model stability is satisfied except for the case the line is between the two lines so it is stable model.

Figure 2



The stability of our model has confirmed again through The CUSUM test of Squares. Results showed that blue line is between the two lines, indicating that our model is stable and the null hypothesis of instability in our model are rejected.

V. CONCLUSION AND RECOMMENDATIONS

This paper has empirically explored the effect of economic variables on national saving of Pakistan by applying quarterly time series data from 1995Q1 to 2018Q4. All the data used in this study have duly obtained from the website of World Bank database. In this study we used ARDL model and according to the analysed results of ARDL money supply growth have negative while gross domestic product, and per capita income have positive but significant effect on national saving of Pakistan in long-run. Inflation have negative and non-significant effect on national saving in both in the long-run and short-run in Pakistan. This paper employed the autoregressive distributed lag (ARDL) approach developed by Pesaran et al. (2001) to examine the different economic variables that affect the national saving of Pakistan for the period of 1995Q1–2018Q4. Estimated results indicated that various economic elements play different roles in explaining the saving behavior in Pakistan. Such as, the national saving rate will increase if the inflation rate in Pakistan economy decreases. Thus, lowering inflation rates and the population will try to increase their saving rate. Estimated results also pointed out evidence that growth matters for saving. Strategies that promote economic development through national saving in the real economy should also be emphasized in Pakistan. Another significant result pointed out is that gross domestic product, per capita income and money supply

growth played a significant role in increasing the national saving rates within Pakistan while inflation is non-statistically significant. Based on estimated results it is recommended that efforts should be geared towards expanding and improving the efficiency of the economic system by removing the barriers that prevent people from saving their money in the banking system. Increased saving rates are of crucial importance for achieving sustainable development and poverty-reducing growth in Pakistan.

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