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The Monetary and Fiscal Determinants of National Savings in Pakistan: An Empirical Evidence from ARDL approach to Co-integration

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Abstract

The objective of this paper is to discuss the short- and long-run relationships between national savings and its monetary and fiscal determinants in Pakistan, during the period 1972-2010. In this study, monetary determinants are M2, Deposit rate, Inflation rate and fiscal determinants are budget deficit, government expenditures, government savings and government revenue (taxation) of national savings. The bounds testing approach to integrated cointegration is used, which is applicable irrespective of whether the underlying variables are of order one or order zero. To estimate the short- and long-run elasticities, the autoregressive distributed-lag (ARDL) and error correction model (ECM) is used. The study concludes that deposit rate and government expenditures is showing positive relationship with national saving in both long run and short run. M2 is negatively related with national saving in long run but highly significant. Inflation rate is presenting a positive relationship with national saving in short run. The coefficient of government saving is larger in short run as compare to long run. No serial correlation exists in both models. Macroeconomic stability combined with solid prudential regulations of financial institutions may create an environment that will raise national savings.

Keywords: national saving, fiscal, monetary, bounds testing, ARDL, ECM.

1. Introduction

Aggregate savings play a dominant role in the economic growth and stability of any country, as it enhances capital development and economic growth. According to Romer (1986) economic growth depends upon technological changes, human capital and

aggregate saving. If poor countries want to increase growth rates then it is necessary for them to save and invest higher proportion of national income.

In the start of 1970's saving rates had been conversant varied and set down subsequently. There exists extensive consent that low aggregate saving is one of the most severe obstructions to attain higher and maintain able economic growth. Presently, Pakistan's economy is facing the problem of macroeconomic instability. Saving decisions have both short run and long run importance for the purpose of macroeconomic analysis. Fundamentally aggregate saving established the quantity of capital stock and a most important source of standard of living. According to economic point of view savings can play important to increase employment, GDP growth and economic stability. Furthermore saving may increase aggregate demand by increasing the level of domestic consumption, interest rates, investment, exchange rates and the stability of economic growth. For the purpose of promoting economic growth and benefits of the underdeveloped countries, saving is considered to be crucial factor.

According to Pakistan Economic Survey (2011-2012), the contribution of aggregate savings to domestic investment is indirectly the mirror image of foreign savings required to meet investment demand. The requirement of foreign savings needed to finance the saving investment gap, reflects the current account deficit in the balance of payments. Aggregate savings are 10.7 percent of GDP in 2011-12 compared to 13.6 percent in 2007-08. Domestic savings have also declined from 11.5 percent of GDP in 2007-08 to 8.9 percent of GDP in 2011-12. Net foreign resource inflows are financing the saving investment gap. Theoretically, there are two ways of improving the savings investment gap. One is through increasing savings and the other is through decreasing investment. Pakistan needs to gear up both savings and investment to enhance the employment generating ability of the economy as well as increase resource availability for investment. During the period July-March 2011-12 an amount of Rs. 160,266.9 million has been collected through National Savings Schemes and earned commission amounting to Rs. 801.3 million.

Therefore the problem statement of this present study is to identify the key monetary and fiscal determinants of National Savings and what are the factors that are responsible for the low savings in developing countries like Pakistan? The present study employs ARDL approach and Error Correction Model, using secondary, annual data for the period 1972-2010.

2. Literature Review

There is large number of studies on national savings in the literature. Some significant studies are reviewed. Khan, Hassan and Malik (1992), present the dependency ratio, foreign capital inflows and rate of savings in Pakistan. The dependent variable is aggregate saving and independent variables are per capita income, interest rate, dependency ratio, foreign capital inflows, foreign aid, change in terms of trade and openness of economy. The results show that saving is positively associated with per capita income and real interest rate while negatively associated with dependency ratio and capital inflow. It is found that savings rate is very low in Pakistan.

Hussain and Brookins (2001), present on the determinants of national saving: an extreme bounds analysis. The authors collect data for the period 1965-1998 and using the methodology of extreme bounds analysis and linear regression. They take national saving

as dependent variable and explanatory variables are dependency ratio, life expectancy, growth rate, income level, public saving and overall budget balance, social security, taxes and government expenditures, inflation rate, credit availability and financial development. The study concludes that only few determinants are positively related to national saving except the income, financial and demographic factors. Government saving and overall budget balance have positive effect on national saving.

Schultz (2004), discusses demographic determinants of savings: estimating and interpreting the aggregate association in Asia. He collects the data from 16 countries during the period 1952-1992 and used different econometric techniques to find out the statistical results. The dependent variable is saving and explanatory variable is age composition of population. The results shows that the association between the saving rates and age composition is depend on time trends of each country and as well as different priorities of families according to their needs and life style. Results conclude that healthier and stronger life will raise the level of aggregate saving.

Narayan and Siyabi (2005), discuss an empirical investigation of determinants of Oman's national savings, during the period 1977-2003 using bound testing approach and ARDL model. The dependent variable is aggregate saving and independent variables are per capita income, urban population rate, domestic credit, current account surplus and money supply. The results indicate that domestic credit, current account deficit and urbanization rate have positive impact on aggregate saving while per capita income and urban population rate and money supply M2 inversely impacted the Oman's aggregate savings.

Narayan and Narayan (2006), explores saving behavior in Fiji, over the period 1968-2000 using ARDL approach to co-integration and error correction model. The dependent variable is aggregate saving and independent variables are real interest rate, income, current account deficit, and age dependency ratio. The study concludes that in the period of long run and as well as in short run a 1% increase in growth rate of per capita income increases the saving rate by 0.05 and 0.07%, respectively that shows positive impact on saving. Age dependency ratio and interest rate showed mix results with saving.

Vincelette (2006) evaluates the determinants of saving in Pakistan. The author collects data for the period 1973-2005 and using the technique of OLS regression. Aggregate saving is taken as the dependent variable and independent variables which effect the aggregate saving are income, interest rate, fiscal policy, financial development and demographic factors. The results show that there is strong negative and statistically significant relationship between financial sector development and aggregate saving and there is also direct negative relationship between fiscal imbalances and saving on the other hand income and demographic factors have significant impact on saving.

Braun, Ikeda and Joines (2008), analyze the saving rate in Japan, for the period 1990-2000. The dependent variable is aggregate saving and independent variables are total factor productivity growth, housing market imperfections, taxation and demographic such as aging of baby boom generation, lower fertility and increase longevity. The study concludes that permanent aging of population and variations in the growth rate of productivity have large effect on the national saving rate

Chaudhry, Faridi, Abbas and Bashir (2010), examined the determinants of national savings of Pakistan in short run as well as in long run. The author used time series data for the period 1972-2008 and used Johansson Co integration technique and vector error

correction model (VECM) .The explanatory variables that effect national saving in long run used in this study are workers remittance, public loans, consumer price index, interest rate, exports and government spending it was found that in long run public loans were negatively related to saving rates while consumer price index, exports, interest rates, workers remittance and Government spending have significant positive influence on national saving. On the other hand in short run time period interest rate and workers remittance had positively related with saving.

3. Theoretical Framework

Different theories have been presented, that are focusing on the importance of aggregate saving, and that will increase high investment and economic growth.

David Ricardo points out the association between saving and government deficit. According to the Ricardian Equivalence approach, if government makes policy to reduce taxes in present period then obviously it is expected by the individuals that private saving will decrease. The reason behind this is that normal and innovative people believe that the fall in the taxes in present period will become a reason to boost taxes in upcoming period. In future, government will finance that reduction of taxes by borrowing it must be repaid these loans by increasing the taxes. So, consumers will prefer to increase their saving instead of their consumption because consumer's disposable income increases due to reduction of taxes. It means today's reduction in taxes is equal to the increase taxation in future time period.

Another hypothesis was presented by Irving Fisher. He gave the sequential choice model of consumption. The choices in his model involves the different periods. According to his theory the decision of individual consumption depends upon current income but also on both present as well as future income. If today consumer makes more consumption then he has less income for spending in the future time period. So, consumer's consumption depends upon the future expectations of income. If it is expected to earn high income then consumer will invest their consumption in the present period. On the other hand today's higher expenditures mean low power to spend money in future time period.

The connection among aggregate income, aggregate consumption and aggregate saving frequently named as the consumption function. Keynes used it for endowment of the expenditures of current consumption which is highly reliable function of current income. "The amount of aggregate consumption mainly depends on the amount of aggregate income." Both aggregate income and aggregate consumption are calculated in terms of wage units. Keynes named it as the fundamental psychological rule of any kind of up to date society. Because when real income rises then consumption level will not increase in the same quantity. So, in the Keynesian theory an increment in real income fractionally consumed and saved. As a result it is assumed that income has positive impact on saving.

In the life cycle hypothesis income and consumption are not equal in different stages of our life. According to this theory youngsters continue to consume more than their income as their basic need are housing, food and education, so they save less. While at the stage of middle age individual's income usually increase and he is able to pay all his debts that he get in early age and also further able to increase his saving. At the end, after retirement individual's income goes to decrease and he usually prefer to consume his saving.

4. Data and Description of Variables

This study consists of secondary, annual data during the period 1972-2010. Data has been obtained from the Handbook of Statistics on Pakistan Economy 2010, Economic Survey of Pakistan 2010-2011 and World Bank. In this present study we concentrate the effects of fiscal and monetary factors on aggregate saving. We test the hypothesis on national saving of the Pakistan's economy by employing a recently popularized co-integration analysis known as autoregressive distributed lag (ARDL) modeling approach. The present study has been specified in following two models,

4.1Model Specification

Model 1: Monetary determinants of National Saving

$NSAV = f (DR, INF, M_2)$……. (1)

$NSAV = \alpha_0 + \alpha_1 DR + \alpha_2 INF + \alpha_3 M_2 + \mu_i$……..... (2)

Where,

National Saving = NSAV

Deposit Rate = DR

Inflation Rate = INF

Broad Money = M_2

Model 2: Fiscal determinants of National Saving

$NSAV = f (BDEF + GEXP + GSAV + GTAX)$……. (3)

$NSAV = \beta_0 + \beta_1 BDEF + \beta_2 GEXP + \beta_3 GSAV + \beta_4 GTAX + \mu_i$……. (4)

Where,

National Saving = NSAV

Budget Deficit = BDEF

Government Expenditures = GEXP

Government Saving = GSAV

Government Taxation = GTAX

4.2 Description of Variables

4.2.1 National Saving Rate (Dependent variable)

In economics, a country's national savings is the sum of private and public savings. It is generally equal to a nation's income minus consumption and government purchases. We have taken the data of national saving from a Handbook of Statistic on Pakistan Economy 2010. First we have divided national saving by GDP deflator. Then converting the national saving into real variable, we have divided national saving by real GDP.

Model 1: Monetary Variables (independent variables)

4.2.2 Broad Money (M_2)

M_2 defines as a measure of money supply that includes cash and checking deposits (M1) as well as near money. "Near money" in M2 includes savings deposits, money market mutual funds and other time deposits. We have taken data from a handbook of statistic on Pakistan economy 2010. First we have divided M_2 by GDP deflator and converting the

M_2 into real variable. Then have divided M_2 by real GDP. According to Hussain and Brookin (2001), Narayan and Siyabi (2005), money supply (M_2) have negative relation on aggregate saving. Because as money supply will increase then aggregate saving will be decrease.

4.2.3 Deposit Rate (DR)

We used the deposit rate of interest in this study. With increase in interest rate, people are encouraged to save more income and consume less in order to earn more return on bank deposits in the long run. There is positive relationship between National saving rate and Interest rate [Nasir and Khalid (2004), Kazmi (1993), Hasnain et al. (2006), Chaudhry et al. (2010)].

4.2.4 Inflation Rate (INF)

It is measured as an annual percentage increase or inflation is a sustained increase in the general price level of goods and services in an economy over a period of time. The data of inflation rate have taken from the hand book of statistic on Pakistan economy 2010. Inflation rate have negative relationship with aggregate saving according to Hussain and Brookins (2001), Burnside, Hebble and Serven (1999), Kazmi (1993), Azam, khan et al. (2010).

Model 2: Fiscal variable (independent variables)

4.2.5 Budget Deficit (BDEF)

The amount by which a government's spending exceeds its income over a particular period of time. The data about budget deficit have taken from the handbook of statistic on Pakistan economy 2010. Sometimes budget deficit have positive influence on national saving as according to the Ricardian Equivalence theory. Usually it is negatively influenced the public saving as according to Hussain (2001), but sometimes it has a negative influence on private savings because of irrationality of consumers.

4.2.6 Government Expenditures (GEXP)

Spending by the government sector including both the purchase of final goods and services, or gross domestic product, and transfer payments known to be as government spending. The data of government expenditures have taken from the handbook of statistic 2010. Government expenditures and aggregate saving are negatively associated to each other as presented by Hussain and Brookins (2001).

4.2.7 Government Saving (GSAV)

Government saving is defined as the amount of tax revenue that is left over after spending occurs. The saving of the government sector is equal to net tax payments minus government purchases (T – G) and the data of government saving have taken from the handbook of statistic on Pakistan economy 2010. Government saving is positively related with aggregate saving as indicated by Cardenas and Escobar (1997), Salam and Kulsum (2001).

4.2.8 Government Revenue (GTAX)

Governments acquire the resources to finance their expenditures by taxation. Its data have taken from the handbook of statistic on Pakistan economy 2010 in this study. The association between government revenue and aggregate saving is positive as presented by Hussain and Brookins (2001).

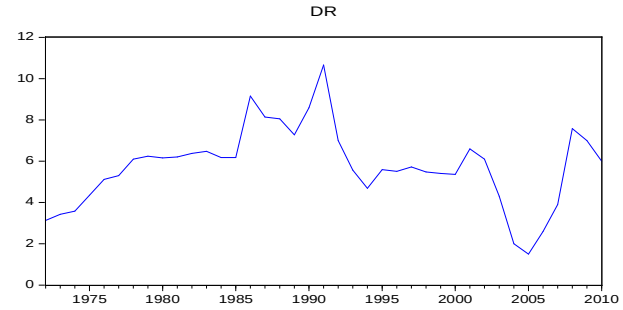
Table 1: Hypotheses of Monetary determinants of National Saving

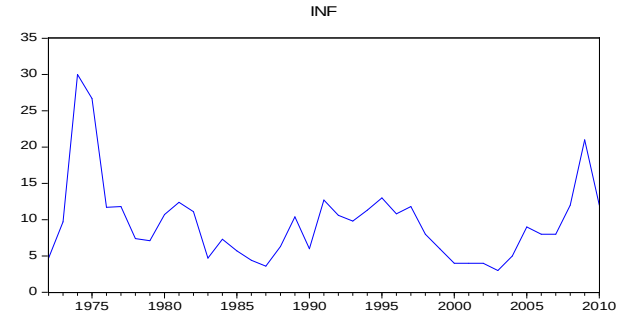
No.		**Hypotheses**
1	H_o	Inflation has a negative impact on aggregate saving.
	H_1	Inflation has a positive impact on aggregate saving.
2	H_o	Broad money (M_2) has a negative impact on aggregate saving.
	H_1	Broad money (M_2) has a positive impact on aggregate saving.
3	H_o	Deposit rate has a positive impact on aggregate saving.
	H_1	Deposit rate has a negative impact on aggregate saving.

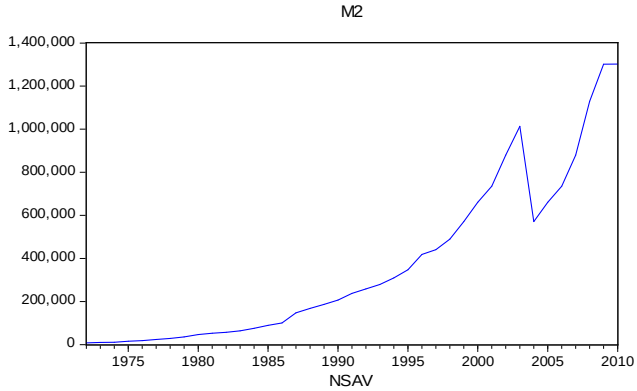
Table 2: Hypotheses of Fiscal determinants of National Saving

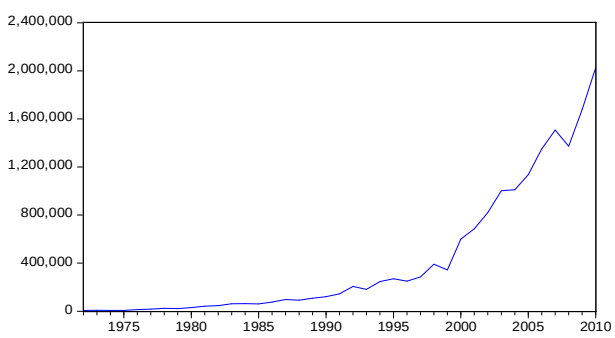
No.		**Hypotheses**
1	H_o	Government expenditures have positive impact on aggregate saving.
	H_1	Government expenditures have negative impact on aggregate saving.
2	H_o	Government saving have positive influence on aggregate saving.
	H_1	Government saving have negative influence on aggregate saving.
3	H_o	Budget deficit have positive impact on aggregate saving.
	H_1	Budget deficit have negative impact on aggregate saving.
4	H_o	Government taxation has positive impact on aggregate saving.
	H_1	Government taxation has negative impact on aggregate saving.

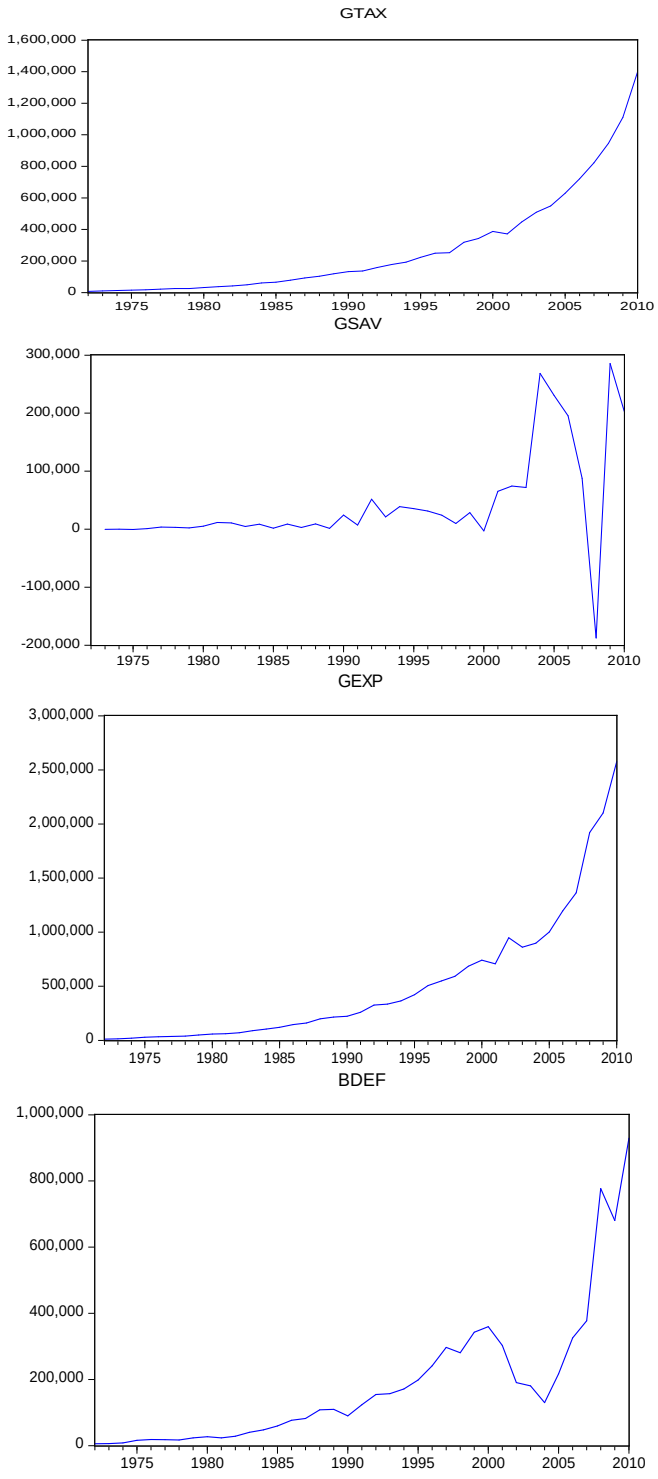
Trends of National Savings and its Monetary and Fiscal Determinants (Figures)










GTAX
1,600,000
1,400,000
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
1975
1980
1985
1990
1995
2000
2005
2010
GSAV
300,000
200,000
100,000
0
-100,000
-200,000
1975
1980
1985
1990
1995
2000
2005
2010
GEXP
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
1975
1980
1985
1990
1995
2000
2005
2010
BDEF
1,000,000
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600,000
400,000
200,000
0
1975
1980
1985
1990
1995
2000
2005
2010

5. Empirical results and Interpretation

5.1 The Unit Root test

It is prerequisite to make sure that none of the variables is integrated of order 2 (I(2)) or higher order while applying the ARDL approach to cointegration, because the calculated F-Statistic doesn't remain valid in the presence of I(2) or higher orders (Ouattara, 2004; Yildirim & Sezgin, 2003). So, testing the unit root is very crucial before estimating the ARDL model. For this purpose, the present study uses Augmented Dicky-Fuller (ADF) unit root test.

Table 3: ADF TEST (Monetary determinants of National Savings)

Variables	Intercept	Intercept & Trend	Order of Integration
DR	-5.30683(0.0001)**	-5.25992(0.0107)**	I(1)
INF	-5.82865(0.0110)**	-5.74207(0.0202)**	I(0)
M_2	-6.25394(0.0200)**	-6.51596(0.0440)**	I(0)
NSAV	-7.17087(0.0104)**	-7.11713(0.0340)**	I(1)

Values in parenthesis are p values…The lag length for the ADF were selected using Schwarz Bayesian Criterion (SBC) ***, **, * imply significance at the 1%, 5%, 10% level, respectively.

Table 4: ADF TEST (Fiscal determinants of National Savings)

Variables	Intercept	Intercept & Trend	Order of Integration
BDEF	-6.028211(0.0077)**	-6.018448(0.0081)**	I(0)
GEXP	-6.868503(0.0031)**	-7.001113(0.0067)**	I(1)
GSAV	-4.598591(0.0007)**	-4.541608(0.0044)**	I(0)
GTAX	-7.738719(0.0000)**	-6.552382(0.0000)**	I(1)
NSAV	-7.170873(0.0142)**	-7.117131(0.0481)**	I(1)

Values in parenthesis are p values..The lag length for the ADF was selected using Schwarz Bayesian Criterion (SBC) ***, **, * imply significance at the 1%, 5%, 10% level, respectively.

In the table(3), the findings of the ADF test of order of integration showed that the national saving (NSAV) and deposit rate (DR) had the integration of order one i.e. I (1), while inflation rate (INF) and money supply (M2) had the integration of order zero i.e. I (0). In table (4), the results of ADF unit root test in the presence of intercept & trend reported that national saving (NSAV), government revenue (GTAX) and government expenditure (GEXP) are stationary at first difference in the presence of intercept and trend. Government saving (GSAV) and Budget deficit (BDEF) are stationary at level. The results of ADF test indicate that the variables are integrated I(0) and I(1).For this reason ARDL approach is used for the co-integration of the models.

5.2 Autoregressive Distributed Lag (ARDL) approach to Co-integration

The autoregressive distributed lag (ARDL) model deals with single cointegration and is introduced originally by Pesaran and Shin (1999) and further extended by Pesaran et al. (2001). The ARDL approach has the advantage that it does not require all variables to be I(1) as the Johansen framework and it is still applicable if we have I(0) and I(1) variables in our set. The short-run and long-run coefficients of the model are estimated simultaneously. The main advantage of ARDL modelling lies in its flexibility that it can

be applied when the variables are of different order of integration (Pesaran and Pesaran1997). Another advantage is that the model takes sufficient numbers of lags to capture the data generating process in a general-to-specific modeling framework (Laurenceson and Chai 2003). The ECM integrates the short-run dynamics with the long-run equilibrium without losing long-run information. It is also argued that using the ARDL approach avoids problems resulting from non-stationary time series data (Laurenceson and Chai 2003). As mentioned earlier, the variables considered in this study are a mix of I(0) and I(1) series. The cointegration test methods based on Johansen-Juselius (1990) require that all the variables be of equal degree of integration, i.e., I(1). Therefore, these methods of cointegration are not appropriate and cannot be employed. Hence, we adopt the ARDL modelling approach for cointegration analysis in this study.

Equation (2) can be written as:

$$\Delta NSAV_t = \delta_0 + \sum_{i=1}^{p} \varepsilon_i \Delta INF_{t-i} + \sum_{i=1}^{p} \varphi_i \Delta DR_{t-i} + \sum_{i=1}^{p} \varphi_i \Delta M2_{t-i} + \sum_{i=1}^{p} \gamma_i \Delta NSAV_{t-i} + \lambda_1 NSAV_{t-1} + \lambda_2 INF_{t-1} + \lambda_3 DR_{t-1} + \lambda_4 M2_{t-1} + \lambda_5 D_{NSAVt} + \mu_{1t}$$

Equation (4) can be written as:

$$\Delta NSAV_t = \delta_0 + \sum_{i=1}^{p} \varepsilon_i \Delta NSAV_{t-i} + \sum_{i=1}^{p} \phi_i \Delta GSAV_{t-i} + \sum_{i=1}^{p} \varphi_i \Delta GTAX_{t-i} + \sum_{i=1}^{p} \gamma_i \Delta GEXP_{t-i} + \sum_{i=1}^{p} \gamma_i \Delta BDEF_{t-i} + + \lambda_1 NSAV_{t-1} + \lambda_2 GSAV_{t-1} + \lambda_3 GTAX_{t-1} + \lambda_4 GEXP_{t-1} + \lambda_5 BDEF_{t-1} + \lambda_5 D_{NSAVt} + \mu_{1t}$$

Since we are using annual data, 2 lags are selected as the maximum lag (*p*) following Pesaran and Pesaran (1997).

5.3 The F-test for Bounds Testing

The bounds test method of ARDL cointegration is being applied irrespectively the order of integration of the variable. There may be either integrated first order I(1) or I(0).

$H_0 = \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = 0$ (No Co-integration)

$H_1 = \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5 \neq 0$ (Co-integration)

Table 5: The F-test for ARDL Co-integration (5% Critical Value Bounds)

Models	F-statistics	I(0)	I(1)
Model 1	5.87	4.066	5.119
Model 2	5.45	3.539	4.667

We have applied the Wald test to find the F-statistic and Schwarz Bayesian Criterion (SBC) to determine the maximum lag length of the variables for both Monetary and Fiscal models. In model 1, the calculated value of F-statistic is 5.87, which is greater than the upper bound at 5%. In model 2, the calculated value of F-statistic is 5.45, which is

also greater than the upper bound at 5%. The above results show that we cannot accept the null hypothesis of no cointegration. Therefore, both models are having a long run relationship.

5.4 Results of ARDL long-run Estimation

Table (6) shows the results of the estimated ARDL long run coefficients of monetary variables and fiscal variables of national saving.

Table 6: ARDL Estimation Results

Monetary Determinants of National Saving			**Fiscal Determinants of National Saving**		
ARDL (1,1,0,0) Long Run Results			**ARDL (2,1,2,1,1) Long Run Results**		
Regressors	Coefficient	T-Ratio[Prob]	Regressors	Coefficient	T-Ratio[Prob]
DR	.25823	2.4524[.022]	GEXP	.16125	2.4489[.022]
M2	-.82067	-4.6781[.000]	GSAV	.70825	.72281[.477]
INF	.53742	.099935[.921)	BDEF	-.0033	-6.2188[.000]
C	-894.6978	-3.9462[.000]	GTAX	.25823	2.4524[.022]
			C	353.8862	3.1114[.005]
Diagnostic Test:					
R2 = 0.82808 Durbin-Watson Statistic = 2.4584 F- Statistic = F(12, 23) 9.2320[.000] Serial Correlation F(1, 22)= 5.5486[0.821] Normality $\chi 2$ (2) = not applicable Heteroscedasticity F(1, 34)= 3.3947[.074]			R2 = 0.94919 Durbin-Watson Statistic = 2.3844 F- Statistic = F(7, 28) = 61.3170 (0.000) Serial Correlation F(1, 27) = 4.3268 (0.745) Normality $\chi 2$ (2) = not applicable Heteroscedasticity F(1, 34) = 0.029335 (0.865)		

5.4.1 ARDL Estimation of Monetary Determinants of National Savings

In table (6) we are analyzing the impact of monetary variables on national saving. The dependent variable is national saving whereas, deposit rate, M_2 and inflation rate are the independent variables.

First we discuss the relation between the inflation rate and national saving. The coefficient of inflation rate is 0.5374, which is showing positive relation with national saving however, not significant. It means that if the inflation rate of a country increases by 1 percent, the national saving increases by .53 percent. The relationship of inflation rate and national saving is against our hypothesis, which state that there is negative relationship between national saving and inflation rate. The reason for this positive relationship in Pakistan might be that because of continuous rising in Price level, producers charge high prices of their products and in this way they earn more profits which increase National Savings. From producer's point of view, there is positive relationship between inflation and National Saving, in Pakistan. Kazmi (1993) and Chaudhry et al. (2010) have also found positive relationship between National Savings and inflation. Burnside, Hebbel and Serven (1999) found that a rise in inflation, induces people to save a larger fraction of their income for precautionary motives. Conversely, a long-run reduction in the inflation rate reduces national saving. Hasnain et al. (2006),

Hussain and Brookin (2001) and khan (1988) has found negative relationship between National Savings and inflation rate.

The parameter estimates of M2 is -.82067, which is showing a negative relation with national savings, as well as highly significant, which is according to the hypothesis. It means that if money supply of a country increases by 1 percent, the national saving decrease by .82 percent. The reason for this negative relationship in Pakistan might be that whenever the volume of M2 rises, it stimulate consumption as a result the private savings rate decreases and thus reduce the propensity to save. As a result of fall in private saving, the national saving also decreases. Ahmad and Mahmood (2013), Narayan and Siyabi (2005), also support the negative relationship between national saving and M2.

The coefficient of deposit rate (DR) is .25823 which has positive and significant effect on national saving, which is according to our hypothesis. It means 1 percent increase in deposit rate raises 0.25 percent of national savings. The reasons of positive impact of rate of interest in Pakistan may be that more savings are generated due to higher returns on savings. This also induce corporate sector to generate its own savings due to high cost of borrowing, thus overall saving would increase [Iqbal (1993)]. The results of our study are consistent with David and Mackinnon (1983), Hasnain et al. (2006), Kazmi (1993) and Chaudhry et al. (2010) studies. The study also supports the classical theory of interest.

5.4.2 ARDL Estimation of Fiscal Determinants of National Savings

In table (6) we are analyzing the impact of fiscal variables on national saving. The dependent variable is national saving whereas, government saving, government revenue (taxation), government expenditure and budget deficit are the independent variables.

The coefficient of budget deficit is -.0033, which is negative and highly significant for National saving, which is against our expectations. It means that if budget deficit of a country increases by 1 percent, the national saving decreases by .82 percent. The reason of this negative relationship might be that as budget deficit increases, government expenditures exceed than the government revenues, as a result public savings decreases. Because the public savings has a large share in national savings so, national savings also decreases with decrease in public saving. Our study is comparable to Jilini, Sheikh, Cheema and Shaikh (2013), Agenor, Aizenman (2002) and Chinn and Prasad (2003).

The coefficient of government expenditure (GEXP), is positive and significant with national saving. The parameter estimates are .16125, which shows an increase in government expenditure by 1 percent brings an increase in national saving by .16 percent. The reason behind this positive relationship is that when the government expenditure increases, the increase in government expenditure raises private savings and its effect is highly significant, which means that government expenditures are mainly contributive towards the income of people and thereby increases national savings. Our study is similar to the studies of Hussain and Brookins (1998), Nasir and Khalid (2004), Chowdhury (2005), Masson Bayoumi and Samiei (1998).

The coefficient of government revenue (GTAX), is positive and significant with national saving. The relation of government revenue with national savings is according to our hypothesis. The parameter estimates are 0.25823, which shows that one percent increase in government expenditure results an increase in national saving by 0.25 percent. The reason behind this positive relationship in Pakistan is that, when the government taxes increases the revenue of the government would be increase. As a result the public saving

increases which eventually positively effect on National saving. Our results are comparable like the study of Loayza, Hebble and Serven (2000) and Rijckeghem (2010).

The coefficient of government saving (GSAV) is .7082, which is positive with national saving but not significant. The relationship of national saving and government saving is according to our hypothesis.This means an increase in government saving by 1 percent results an increase in national saving by .70 percent. The reason behind this positive relationship is that when the government saving increases, then government invest saving for the purpose of more economic growth. By this act, income of people will increase and as a result domestic and private saving will also increase that will increase national saving in return. Masson et al (1995) suggested that by increasing public saving, government can raise the national saving rate. Our results are similar as Loayza, Klaus, Hebble and Serven (2000).

5.5 Results of Error Correction Estimation

After analyzing the long-run correlation among variables, then we can also estimate the short-run analysis of the independent variables with respect to national saving. The coefficient of ECM explains adjustment speed of short-run equilibrium. The sign of ECM must be negative and significant.

5.5.1 ECM Estimation of Monetary Determinants of National Savings

Table (7), analyzes the short run dynamics of monetary variables on national saving. The dependent variable is national saving whereas, deposit rate, broad money (M_2) and inflation rate are independent variables. The coefficient of deposit rate (DR) is 25.3391 which is statistically significant at 5 percent and have positive relation with national saving in short-run. By comparing short run and long run result, we analyze that DR is showing positive relationship with national saving and also significant in both long run and short run.

The coefficient of broad money (M_2) is .44360 which is highly significant at 5% and shown a significant impact on national saving (NSAV). It means that 1% increase in money supply will cause to increase national saving by 0.44%. After comparing the results of long run, we have realize that coefficient of M2 is showing negative relation with national saving in long run but highly significant.

The coefficient of inflation rate (INF) is .29050, which is presenting a positive relationship with national saving in short run. However the coefficient is not significant. It means that 1% increase in inflation rate will bring 0.29 % increase in national saving (NSAV). Inflation rate has a similar impact on national saving both in short run and long run. The coefficient of ECM_{t-1} for monetary determinant of national saving is equal to (-.54054) for the short-run and implies that deviation from the long-run national saving by 0.54% over each year at 1% level of significance. And this shows a reasonable faster speed of adjustment.

Table 7: ECM Estimation Results

Monetary Determinants of National Saving			**Fiscal Determinants of National Saving**		
ARDL (1,1,0,0) selected based on SBC			**ARDL(2,1,2,1,1) selected based on SBC**		
Regressors	Coefficient	T-Ratio[Prob]	Regressors	Coefficient	T-Ratio[Prob]
dDR	25.3391	2.8666[.008]	dGEXP	.069555	1.5492[.133]
dM2	.44360	6.3776[.000]	dGSAV	1.9065	3.7980[.001]
dINF	.29050	.10028[.921]	dBDEF	-.4425E-3	-1.1803[.248]
C	-483.6197	-5.2544[.000]	dGTAX	-.089826	-1.3477[.189]
ecm(-1)	-.54054	-6.1198[.000]	C	270.7188	3.2075[.003]
			ecm(-1)	-.76499	-5.8974[.000]

5.5.2 ECM Estimation of Fiscal Determinants of National Savings

The short-run dynamics of fiscal factors of national savings are shown in Table (7). The coefficient of government expenditures (dGEXP) is .069555 which is not statistically significant however showing a positive relation with national saving in short run. It shows that 1 percent increase in government expenditures will cause to increase national saving by .06%. This positive relation of dGEXP is approximately same as long-run.

The coefficient of government saving (dGSAV) is 1.9065 that is positive and highly significant. It shows that 1 percent increase in government saving will lead to increase in national saving by 1.9% in short-run. By comparing the short-run and long run results, we have discover that the coefficient of government saving is larger in short run as compare to long run. The coefficient of government saving in short run shows positive relation with national saving but it is not statistically significant.

The coefficient of budget deficit (dBDEF) is -.4425, has negative impact on national saving in short-run but not significant. This means that 1 percent increase in budget deficit (dBDEF) will tend to decrease national saving by .44%. And this result is similar to the long-run results because in long-run budget deficit (dBDEF) has negative influence on national saving

The coefficient of government revenue (dGTAX) is -.089826 which is negative but significant with aggregate saving in short-run. This shows 1 percent increase in government revenue will lead to decrease national saving by .089%, which is against our hypothesis. However, government revenue (dGTAX) has significant and positive influence on national saving in long-run. The coefficient of ECM_{t-1} for fiscal determinants of national saving is equal to -.76499 for the short-run and significant. This implies that deviation from long-run national saving is corrected by 76% over each year at 1% level of significance. So, this shows a reasonable faster speed of adjustment.

5.6. Diagnostic Test of the ARDL Models

Table (6) shows diagnostic test, which shows the high values of R^2 for both ARDL models, presenting that the overall goodness of fit of the models is satisfactory. The F-

statistics measuring the joint significance of all Regressors in the model are statistically significant at the 1 percent level for all models. Similarly, the Durbin-Watson statistics for both models is more than 2 .The diagnostic test results show that both the models pass the tests for functional form and normality. However, the results indicate that there exists no serial correlation and heteroscedasticity in both the models. The ARDL model has been shown to be robust against residual autocorrelation. Therefore, the presence of autocorrelation does not affect the estimates (Laurenceson and Chai 2003, p.30). Since the time series constituting both the equations are of mixed order of integration, i.e., I (0) and I (1), it is natural to detect heteroscedasticity.

6. Conclusion

The purpose of this study is to analyze the determinants of Pakistan's aggregate saving rate. The monetary determinants are Inflation Rate and Deposit rate. The fiscal determinants are Government expenditures, Government revenue, Budget Deficit and Government Savings. We utilized ARDL testing approach to check the long-run relationship of aggregate saving and its determinants, and Error Correction Model (ECM) for short-run dynamics during the period 1974-2010, in Pakistan. we have analyze that deposit rate is showing positive relationship with national saving and also significant in both long run and short run. In short run, broad money (M_2) have positive impact on national saving After comparing the results of long run, we have realize that coefficient of M2 is showing negative relation with national saving in long run but highly significant. Inflation rate is presenting a positive relationship with national saving in short run and long run. The coefficient of ECM_{t-1} for monetary determinant of national saving is equal to (-.54054) for the short-run and implies that deviation from the long-run national saving by 0.54% over each year at 1% level of significance. And this shows a reasonable faster speed of adjustment. The short-run dynamics of government expenditures showing a positive relation with national saving in short run and long-run We have discover that the coefficient of government saving is larger in short run as compare to long run. However, governments saving in short run shows positive relation with national saving. Budget deficit have negative impact on national saving in short-run and long-run. Government revenue is negative with aggregate saving in short-run. However, government revenue has significant and positive influence on national saving in long-run. The coefficient of ECM_{t-1} for fiscal determinants of national saving is equal to -.76499 for the short-run and significant. This implies that deviation from long-run national saving is corrected by 76% over each year at 1% level of significance. So, this shows a reasonable faster speed of adjustment.

It is therefore recommended that as the government should focus toward improvement on the fiscal balance and household savings. Several long term savings instruments may be developed to increase household savings. Effort should be made to expand network of National Savings Schemes, microfinance institutions, banks and postal savings in the country.

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