The Role of Interest Rate, Unemployment and Inflation in Deciding Domestic Saving of Pakistan:
An Empirical Analysis

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Abstract
This study has examined the impact of interest rate, unemployment rate, inflation rate and worker remittances on domestic savings in Pakistan. For examining the stationarity of the variables Augmented Dickey-Fuller unit root test is used. Maximum 2 lag are selected by following different lag selection criteria. Autoregressive Distributed Lag model is used for examining the cointegration among the variables of the model. On the basis of estimated results, it is concluded that interest rate, inflation rate, unemployment rate and worker remittances are playing important role in determining domestic savings in Pakistan. The government of Pakistan has been trying to increase overall rate of saving and for this purpose it introduces many schemes. But government is unable to get required results in this concern because of low incomes, unemployment and improper implementation of the socio-economic policies. This study has tried to contribute in literature as existing literature hardly did this type of exercise.

Keywords: Saving, Inflation, Unemployment, Remittances, Interest Rate
JEL Codes: E3, E4

1. Introduction

According to classical economists, savings are equal to investment and neo-classical pointed out economic growth direct and indirectly depends upon savings. Classical theory assumptions include the beliefs that markets self-regulate, prices are flexible for goods and wages, supply creates its own demand, and there is equality between savings and investments. There is strong theoretical and empirical relationship is existing between economic growth and aggregate savings. If a country and wants to increase its economic growth, it is necessary for it to save and invest at the same time (Romer, 1986). Solow (1957) states that higher saving rate increases the growth rate of output per-worker in transitional stage as economy moves traditional structure to modern structure. The neoclassical growth theory emphasizes the importance of savings and capital accumulation together which exogenously determined economic growth of country. If savings are higher, then capital per worker will grow faster and leading from income per capita will rise and vice versa. But savings do not play any significant role in determining the fund supply for investment in Keynes' reasoning. According to Keynes savings have no special efficiency as compared with consumption, in releasing cash and restoring liquidity. To Keynes, excessive saving, i.e. saving beyond planned investment, was a serious problem, encouraging recession or even depression. Excessive saving results if investment falls, perhaps due to falling consumer demand, over-investment in earlier years, or pessimistic business expectations, and if saving does not immediately fall in step, the economy would decline. Pakistan Economic Survey (2011-2012) mentions that the contribution of aggregate savings to domestic investment is indirectly the mirror image of foreign savings required to meet investment demand however interestingly, Pakistan actually stands out to reflect one of the lowest savings in the region [Hussain and Brookins (2001), Burnside, Hebble and Serven (1999), Kazmi (1993), Azam, Khan et al. (2010)]. World Bank (2010) points out that savings in proportion to the country's Gross Domestic Product stand around 14 per cent in Pakistan compared to 38 per cent in Bangladesh, 34 per cent in India and 25 per cent in Sri Lanka. The true picture (table-1) of saving trends of Pakistan economy is shown in table-1. In 2000 economic growth was around 2.0 percent. After that growth rate rose to 7.5 and 9.0 in the years 2003 and 2004 respectively. It shows a great performance of the country. The foreign savings are negative in till 2003 but national and domestic savings growth rate is positive and high. But after 2003, foreign saving has started increasing and accounted 8.5 percent in 2007 but it was again negative in 2010s. The history of Pakistan shows that domestic or household savings have played an important role in increasing capital accumulation and attaining high economic growth rate. But decrease in domestic savings decreases the capital accumulation and economic growth rate (Solow, 1956). This study has highlighted economic factors which impact domestic saving in Pakistan. In this study domestic saving is taken under the perspective of interest rate, unemployment and inflation rate in case of Pakistan. National saving also impacted by worker remittances

Table-1

Years	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Growth rate	2.0	3.1	4.7	7.5	9.0	5.8	6.8	3.7	1.7	3.8	2.4
Total Investment	17.2	16.8	16.9	16.6	19.1	22.1	22.5	22.1	18.2	15.4	13.4

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National saving	16.5	18.6	20.8	17.9	17.5	18.2	17.4	13.6	12.5	13.1	13.8
Foreign saving	0.7	-1.9	-3.8	-1.3	1.6	4.5	5.1	8.5	5.7	2.0	-0.4
Domestic Saving	17.8	18.1	17.6	15.7	15.4	16.3	15.6	11.5	9.8	9.3	9.5

Source: Economic Survey of Pakistan

2. Literature Review

In the theoretical and empirical literature there are number of studies which examine the determinants of savings in case of developed and developing countries. In this study most relevant and recent studies are used for review literature. Hussain (1996) examines the saving performance of Pakistan's economy. This study shows that saving performance of Pakistan is very weak as compared to other Southeast Asian economies. During last decade there is gradual increase in the private savings of Pakistan and changes in the demographic structure of the population and financial deepening were potentially associated with long-run movements in Pakistan's private saving rate over this period. Financial development and deepening can also affect the saving performance of an economy. Private saving will likely require further financial development and a decline in the growth rate of population. The ratio of private saving to income in Pakistan rose by 8 percent during the selected time period. Financial deepening and development accounted for about 3 percent of this increase. Ahmad et al. (2006) investigate the valid long run economic relationship among the determinants of household saving in case of Pakistan. The results of this study indicate that demographic variables have significant negative impacts on household saving. Their study shows that when substitution effect dominates the income effect, then the real interest rate has a positive effect on the saving rate. Inflation rate also have a significant negative effect on household saving. It is suggested that the government should encourage national saving schemes to expand household savings for more formation of capital. Ahmed et al., (2006) state that domestic resource mobilization is one of the key determinants of economic growth. Time series date is used in this empirical study. Johansen cointegration technique is used for empirical analysis. They found that despite high economic growth Pakistan's saving performance is very low relative to other countries in the region, income and growth have a significant positive effect on household saving. Similarly, positive impact of real interest rate on saving indicates that the substitution effect dominates the income effect in case of Pakistan. Rate of inflation affects household saving rate negatively. The demographic factors have a significant negative effect on household saving rate in Pakistan.

Ciftcioglu and Begovic (2010) highlight the impact of domestic saving on economic growth in the medium term. Empirical results show that domestic saving has exert a positive effect on the growth rate of for Central and East European countries. There is low saving rate in these countries due to global crisis and policy response. On this basis of result, it is suggested that countries which might be faced this kind of domestic savings constraint could find it beneficial to focus on formulating new growth strategies that puts additional emphasis on micro policies aiming at both improving the resource efficiency and increasing the rate of accumulation of stock of human capital. Azam et al (2010) highlight the significance of saving in the socio- economic development of Pakistan, to examine the effects of inflation rate, lagged saving rate and per capita income on national saving of Pakistan. OLS is used for empirical analysis. Results shows positive impact of per capita income, and lagged saving rate on national saving of Pakistan and strongly supports the study hypothesis but the impact of inflation rate is negative on national saving of Pakistan. Per capita income needs to be increase and inflations needs to be controlled in order to increase the level of national saving because the significance of saving is highly important for improving economic development. Temidayo and Taiwo (2011) examine the impact of domestic saving on the economic growth in Nigeria. Secondary data is used to for the period of 1970 to 2006. And they find that investment is not responding to savings in Nigeria's economy and also that investment in the economy is not transforming into growth as proposed by economic theories. Savings and investment are positively correlated but this correlation is very weak. Growth and investment are also weakly and negatively correlated. The correlation between savings and economic growth is positive but very weak. These correlations imply that there is a weak relationship between savings, investment and economic growth rate in the economy. Policy implication is that government should adopt policy enhancing intermediation between savings and investment in the economy by providing regulating and coordinating role to ensure effective intermediation between savings and growth in the economy. Rasmidatta (2011) analyzes domestic saving as a main factor to economic growth of Thailand. Granger causality test the study favor the hypothesis which suggests that the causality is from economic growth rate to growth rate of domestic saving in Thailand only. The investigation suggests that gross domestic saving per capita growth rate does not help to narrow the different of GDP between two countries.

Faridi, Arif (2012) investigates the importance of Globalization an important determinant of national, private and public savings. Annual data for the variables national savings, public savings, private savings, consumer's price index, real interest rate, budget deficit, worker's remittances and trade openness are obtained. It is found that the variables

meet the property of stationarity at level I (0) so OLS is applied. Results highlight the importance of globalization in order to enhance savings. Consumer price index and interest rate are positively and significantly related to national as well as private and public savings. Government deficit has inverse relationship with savings. The study shows workers' remittances have a direct and significant impact on all types of savings. Policies suggest that government should provide enabling environment and fiscal incentives for enhancing the foreign direct investment which increases the savings in the country. Keho (2012) focuses the dependency ratio effect on savings. In this empirical analysis Granger and test of co integration is used to test the 16 African countries which reveal that due to dependency ratio savings rate is negative in nine countries and positive in two countries. It also shows that one cannot argue that demographics do not matter for savings behavior in African countries. Most developing countries are at an earlier stage in the demographic transition induced by lower rates of fertility and mortality. However, the dependency ratios remained high compared to Asian countries. Programs that will make available less costly and painful birth-reducing methods should be expanded, particularly in rural areas where the motivation for fewer births is not yet present. Jilani et al., (2013) analyze the impact of various factors on national savings of Pakistan including GDP, inflation, fiscal deficit and rate of interest. They use independent variables i.e. GDP, inflation, fiscal deficit and rate of interest possess long term equilibrium with national savings. Their study shows the inflation having negative but significant impact on national savings, hence policies should be made to reduce inflation and real rate of interest shows negative and insignificant impact on national savings. Policy implication is that that government should not rely on manipulation of interest rates in order to boost national savings. Khan et al (2013) state the impact of demographic factors on household savings in Pakistan. The data has been gathered from Federal Bauru of Statistics. Estimation of co-integration is used to determine the positive impact of income, financial development, life expectancy, education of male and females but negative of dependency ratio on household savings. The policies are suggested to increase the incomes of households and government should focus on deepening of financial sector.

Turan and Gjergji (2014) study the relationship between economic growth and savings. Johansen co-integration test. According to the empirical results it is revealed that there is a positive relationship between savings and economic growth and the complementary role of FDI in economic growth and the move together in long run. It is suggested that the government must pay special attention toward foreign direct investment policies which could enhance savings and promote economic growth as well. Kaberuka and Namubiru (2014) investigate the effect of remittances on gross domestic savings in Uganda. Remittances are mainly devoted to daily consumption needs Empirical result shows that remittances have a negative effect on gross domestic savings. Other variables including deposit interest rate, real effective exchange rate, inflation and per capita GDP had a positive contribution to domestic savings in Uganda. Policy implication is that Government should have established agencies in countries to where most Uganda's migrate in order to capture their savings and help them with those savings into productive projects in Uganda. Khan et al., (2014) investigate the impact of interest rate, inflation rate and per capita income on household's saving in Pakistan for the period of 1981 to 2011. They analysis the private sector saving is main driver of overall saving in Pakistan. Interestingly, out of private sector saving, household's saving is nearly 90 percent which highlight its importance in economic development of Pakistan. They also examined that Pakistan's saving trend is low if compared with regional countries having almost same income level. It is due to low saving rate and the saving investment gap is high in Pakistan, and Pakistan is highly dependent on external borrowing to finance the increasing saving – investment gap. Mansoor and Khattak (2014) investigate the determinants of savings by households. They find out that employment and income has a positive relation with the savings of the people while tax burden and unemployment reduces the savings of the people. OLS is used for empirical analysis of data. The policy which is recommended to address the problem is government should provide the basic elementary education and scholarships so that people can find better job opportunities in the future. Micro-level loans should be provided to the farmers and also to those who want to start business of their own. Chaudhry et al (2014) study the concentrate effects of fiscal and monetary factors on aggregate saving in Pakistan. Their study shows the negative relationship between M2 and national saving. Deposit and inflation rate is showing positive relationship. ARDL and ECM approach is used to estimate long run and short run elasticities respectively. Government should expand network of National Savings Schemes, microfinance institutions, banks and postal savings in the country.

Ahmed (2015) focus on the long run and short association of different variables with private savings in the case of Pakistan such as GDP per-capita, inflation rate, financial development, dependency ratio and fiscal development. Government uses this different variable in the long run and the short run to influence the level of private savings. In the short run government can increase the private savings by decreasing the financial development, increasing deposit rates and lending rates and by offering attractive programs relating the old age benefits. And the policy Implication is that the government should provide protection to all the private savers against theft, fear of inflation and collapse of

financial system and should reward the savers. This can be done by strengthening the local financial institutions, controlling the inflation rate and increasing the role of market signals in deciding the allocation of savings and investment. Sabra (2016) focuses the impact of remittances on economic growth, investment and domestic savings in the presence of international capital inflows. Panel data of selected MENA countries, which are Algeria, Egypt, Jordan, Lebanon, Morocco, Palestine, Syria, and Tunisia is used. By using Two-Stage Least Squares (2SLS), Three Stages Least Squares (3SLS) and Seemingly Unrelated Equations (SURE) found positive impact on growth through supporting family consumption that enhance more future consumption and may increase imports, which decreases savings under the low levels of income. Asad et al., (2016) study the relationship between worker's remittances and economic growth. The variables under study are Gross Domestic Product, workers' remittances, labor migration (LMR), unemployment rate, government expenditure, human capital development, household consumption, investment, and domestic savings. Co-integration approach shows that there exists long-term relationship between worker's remittances and unemployment. The recursive OLS results manifested that workers' remittances have significant positive impact on consumption and saving in the country then consumption and saving in turn influence the GDP i.e. economic growth level. It is suggested that Pakistan government should form friendly policy to ensure the uninterrupted and increased inflows of workers' remittances and their efficient utilization to ensure economic growth. Arshad and Ali (2016) revisited the relationship of inflation, interest and unemployment rate in Pakistan. The study finds there is long run relationship among inflation, interest and unemployment rate in case of Pakistan.

3. The Model

Several researches have been done for explaining the domestic behavior magnitude within a nation. Sabra (2016), Khan et al., (2013), Rasmidatta(2011), Kaberuka and Namubiru (2011), Faridi and Arif (2012), Khan (2014), Ciftcioglu and Begovic (2010) investigated domestic saving by using different functional forms. The low domestic saving is a major issue in most developing countries under economic misery. The model that is used in this study is modified from Kaberuka and Namubiru (2014) and Faridi and Arif (2012). The model predicts that domestic saving is determined by inflation, interest rate, unemployment and worker's remittances. Thus, model of the study becomes

$$SAV = f(INF_t, IR_t, UNP_t, WR_t)$$

Where,
SAV= Domestic Saving
INF=Inflation
IR= Interest Rate
UNP= Unemployment
WR=Worker Remittances
t   = Time period

The main objective of this study is to analyze the impact of interest rate and unemployment rate on domestic saving in Pakistan from 1972-2020. The data for all variables is taken from various issues of *Pakistan Economic Survey* and *World Development Indicators* databases maintained by World Bank.

4. Econometric Methodology

For measurable economic analysis of macroeconomic models, the use of econometric tools is crucial. The involvement of time trend makes the time series data non-stationary, in most of macroeconomic data, and may be the regression results of this data are spurious. Nelson and Plosser (1982) mention that commonly time series data of macroeconomic variables have a unit root problem. They control the presence or absence of unit root helps to check the validity of data producing process. Stationary and non-stationary data have some different features. The stationary time series data have temporary shocks which vanish over the time and series move back to their long-run means values. Whereas, shocks are long-lasting in non-stationary time series data. In case if the time series data has only negative or positive shocks, the time series data is non-stationary. In literature, several unit root tests are available for making data stationary. For this purpose, the study uses Augmented Dickey-Fuller (ADF) unit root test (1981).

4.1. Augmented Dickey-Fuller (ADF) Test

Dickey and Fuller (1981) propose the Augmented Dickey-Fuller (ADF). The general forms of the ADF can be written as:

$$\Delta X_t = \delta X_{t-1} + \sum_{j=1}^{q} \phi_j \Delta X_{t-j} + e_{1t}$$

$$\Delta X_t = \alpha + \delta X_{t-1} + \sum_{j=1}^{q} \phi_j \, \Delta X_{t-j} + e_{2t}$$

$$\Delta X_t = \alpha + \beta t + \delta X_{t-1} + \sum_{j=1}^{q} \phi_j \, \Delta X_{t-j} + e_{3t}$$

Xt is a time series for testing unit roots, t is the time trend and et is error term having white noise properties. If j = 0, it represents the simple DF test. The lagged dependent variables in the ADF regression equation are included until the error term becomes white noise. For checking the serial correlation of error terms LM test is used. The null and alternative hypotheses of ADF unit roots are:

H0: $\delta = 0$ non-stationary time series; so it has unit root problem.

Ha: $\delta < 0$ stationary time series.

Using OLS technique and computing τ statistic of the estimated coefficient of Xt-1 and comparing it with the Dickey Fuller (1979) critical τ values, if the calculated value of τ statistic is greater than the critical value then rejects the H0. In this case the time series data is stationary. On the other hand, if we fail to reject H0, the series is non-stationary. In this way by applying this procedure on all variables, we can easily find their respective orders of integration.

4.2. Auto Regressive Distributed Lag Model (ARDL) Approach to Cointegration

In literature, a number of cointegration tests for econometric analysis are available. Most famous and traditional cointegration tests are the residual based Engle-Granger (1987) test, Maximum Likelihood based on Johansen (1991/1992) and Johansen-Juselius (1990) tests. One thing common in these tests is that they require same order of integration for their analysis. These cointegration tests become invalid and inefficient when the variables of the model have different level of integration. Moreover, the analysis based on these tests of cointegration do not provide information about the structural breaks of time series data and also have low power of prediction. With the passage of time structural changes have occurred in time series such as depression, recessions, new institutional activities and changes in policy regime. The problem with these methods is that the testing of the null hypothesis of structural stability against the alternative of a one-time structural break only. If such structural changes are present in the data generating process, but not allowed for in the requirement of an econometric model, results may be biased. ARDL bound testing approach presented by Pesaran and Pesaran (1997), Pesaran and Shin (1999), and Pesaran, Shin and Smith (2001) has several benefits over traditional methods of cointegration. Firstly, ARDL can be applied irrespective of the order of integration. Secondly, ARDL bounds testing approach to cointegration can be used for small sample size. Thirdly, this approach allows taking adequate number of lags for capturing the data generating process in a general to specific modeling framework. Lastly, ARDL gives effectual and valid detailed information about the structural breaks in data. This technique is based on Unrestricted Vector Error Correction Model (UVECM) which has better properties for short and long-run equilibrium as compared to traditional techniques (Pattichis, 1999). Pesaran and Shin (1997) and later on Pesaran et al. (2001) remark that under certain environment long-run correlation among macroeconomic variables can be found with the help of Autoregressive Distributive Lag Model (ARDL). After lag order selection for ARDL procedure, simply OLS can be used for identification and estimation. Valid estimates and inferences can be drawn through the presence of unique long-run association that is vital for cointegration.

$$\Delta lnY_t = \beta_1 + \beta_2 t + \beta_3 lnY_{t-1} + \beta_4 lnX_{t-1} + \beta_5 lnZ_{t-1} + \cdots + \sum_{h=1}^{p} \beta_h \, \Delta lnY_{t-h} + \sum_{j=0}^{p} \gamma_j \, \Delta lnX_{t-j}$$
$$+ \sum_{k=0}^{p} \phi_k \Delta lnZ_{t-k} + \cdots + u_{it}$$

At first the study will find the magnitude of relationship among the variables in case of Pakistan by applying the bounds test.

H0: $\beta 3 = \beta 4 = \beta 5 = 0$ (no cointegration among the variables)

HA: $\beta 3 \neq \beta 4 \neq \beta 5 \neq 0$ (cointegration among variables)

If there exits long-run cointegration relationship among the variables, then for finding short-run relationship the study uses the Vector Error Correction Model (VECM). The VECM is explained as under:

$$\Delta lnY_{it} = \beta_1 + \beta_2 t + \sum_{h=1}^{p} \beta_h \, \Delta lnY_{it-h} + \sum_{j=0}^{p} \gamma_j \, \Delta lnX_{t-j} + \sum_{k=0}^{p} \phi_k \Delta lnZ_{it-k} + \omega ECT_{t-1} + u_t$$

5. Results and Discussion

The table-1 presents descriptive statistic of the variables. By looking at this table we can analyze our variables of the model. Skewness and Kurtosis help to overview the volatilities among the variables of the model and descriptive statistic also explains the normality of the variables. The estimated descriptive statistics reveals that worker's remittances and unemployment are negatively skewed whereas, saving, inflation and interest rate are positively skewed. This estimated descriptive statistics show that all variables of the model have positive kurtosis values. The estimated results of Jarque-Bera specify that all variables of the model are normally distributed.

Table-1: Descriptive Statistics

	SAV	LWR	LUNP	LIR	LINF
Mean	11.25542	7.583164	0.872295	2.355762	2.118387
Median	10.21141	7.559839	1.615663	2.302585	2.145665
Maximum	17.61168	9.541345	2.112635	2.995732	3.283278
Minimum	4.688731	4.912655	-1.108663	1.791759	1.069573
Std. Dev.	3.932042	1.057431	1.133728	0.244805	0.527926
Skewness	0.243158	-0.555720	-0.485628	0.465424	0.022381
Kurtosis	1.706602	3.749171	1.616461	3.301253	2.756433
Jarque-Bera	3.341417	3.143976	5.000656	1.675154	0.107325
Probability	0.188114	0.207632	0.082058	0.432758	0.947752
Sum	472.7277	318.4929	36.63640	98.94199	88.97227
Sum Sq. Dev.	633.8991	45.84455	52.69887	2.457106	11.42696
Observations	49	49	49	49	49

The below table-2 shows the correlation matrix among variables of the model. Saving has a positive and significant correlation with unemployment. Saving has a positive but insignificant correlation with interest rate, worker's remittances. Saving has a negative and insignificant correlation with inflation. Workers remittances have a positive and significant correlation with unemployment and interest rate. It has a negative and insignificant correlation with inflation. Unemployment has a positive and significant correlation with interest rate and negative and insignificant correlation with inflation. Interest rate has a positive and significant correlation with inflation. The overall results show that most of our independent variables have a positive correlation with our dependent variable. The augmented Dickey-Fuller (ADF) (1981) test is used for checking the stationarity of the variables. The results in the table-3 show that inflation and interest rate are stationary at level. Whereas domestic saving, unemployment and worker remittances are stationary at first difference. But at first difference all variables are stationary. Hence there is mix order of integration among the variables of the model so we can apply Auto-regressive Distributed lag (ARDL) bound testing approach to co integration.

The lag order selection criterion of variables is presented in Table 4. An optimal lag length has been chosen on the basis of these criteria. The maximum two lags are permitted in Vector Auto-Regressive (VAR). Lag selection like Sequential Modified Likelihood Ratio (LR), Final Prediction Error (FPE) and Akaike information criterion recommend an optimal lag length of 2. Hence for the analysis, the optimal lag length 2 is being used. The results of the bound testing approach for domestic saving, unemployment, interest rate, worker's remittances, and inflation rate are presented in table. The results of bound testing approach in table-5 show that F-statistic is greater than the upper bound value at 2.5 percent so we accept the alternative hypothesis that there is co-integration among the variables of the model.

Table-2: Covariance Analysis: Ordinary

Variables	SAV	LWR	LUNP	LIR	LINF
SAV	1.000000				
LWR	0.062530	1.000000			
LUNP	0.715511	0.593069	1.000000		
LIR	0.115258	0.311217	0.379579	1.000000	
LINF	-0.282729	-0.217794	-0.185757	0.323263	1.000000

Table-3: Augmented Dickey-Fuller Unit root test

At level

Variables	T-Statistic	Prob.
LNINF	-3.423090	0.0164
LIR	-4.078927	0.0028
SAV	-1.739099	0.4046
LWR	-0.805204	0.8070
LUNP	-1.463377	0.5416
At first difference		
DLNINF	-7.550930	0.0000
DLIR	-9.635016	0.0000
DSAV	-7.224687	0.0000
DLWR	-10.52270	0.0000
DLUNP	-4.005396	0.0034

Table-4: VAR Lag Order Selection Criteria

SAV, LINF, LIR, LWR, LUNP						
Time Period: 1972-2020						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-196.5696	NA	0.021228	10.33690	10.55018	10.41342
1	-56.97782	236.2322	6.03e-05	4.460401	5.740064*	4.919533*
2	-27.11491	42.88008*	5.02e-05*	4.211021*	6.557069	5.052763
3	-10.15942	19.99878	9.06e-05	4.623560	8.035994	5.847912
* indicates lag order selected by the criterion LR: sequential modified LR test statistic (each test at 5% level) FPE: Final prediction error AIC: Akaike information criterion SC: Schwarz information criterion HQ: Hannan-Quinn information criterion						

The long run results of the study are presented in the table-6. The results of this study highlight that inflation has negative and significant impact on domestic saving. As inflation increases by one percent then domestic saving will decreases by 2.21 percent. This negative relationship also supports Jilani et al., (2013), Azam et al., (2010) and Ahmed et al., (2006) studies. Worker's remittances have a significant but negative relationship with domestic saving in case of Pakistan. If worker's remittances increase by one percent, then domestic saving will decrease by 2.263 percent. These results also support the findings of Sabra (2016). Interest rate has an insignificant and negative impact on domestic saving. According to our finding if interest rate increases by one percent than domestic saving will decrease by 1.78 percent in case of Pakistan. Result of Jilani (2013) is supported our finding. Unemployment has significant and positive impact on domestic saving. As unemployment increases by one-unit domestic saving increases by 1.39 unit.

The table 7 shows the results of short run. Worker remittances have a significant but negative impact on domestic saving. As in short run phenomena if worker remittances increase by a percent domestic saving decreases by 2.86 percent. Unemployment is statistically significant and has a positive impact on domestic saving. If unemployment increases by percent unit then domestic saving increases by 4.979 percent. In short run interest rate has a positive and significant impact on domestic saving. As interest rate increases by one percent domestic saving increases by 3.743 percent. Inflation has a negative but significant impact on domestic saving in short run. If inflation increases by one-unit domestic saving decreases by 1.53 percent. The negative and statistically significant value of ECM_{t-1}, -0.690676leads to support a long run relationship among the series in case of Pakistan. The coefficient is statistically significant at 2.5% level and the significant value of ECM shows the speed of adjustment from short run to long run. The short run deviations from long run equilibrium are accorded by 69% towards long run equilibrium path each year.

Table-5: ARDL Bound Testing Approach

Dependent Variable SAV; ARDL (1,1,1,1,1)
F-Statistics 4.682342

Critical values	Lower Bound	Upper bound
97.5%	3.25	4.49
95%	2.86	4.01
90%	2.45	3.52

Table-6: Long Run Coefficient using the ADRL Approach

| Dependent variable is SAV; ARDL (1,1,1,1,1): Time Period 1972-2020			
Regressor	Co-efficient	Standard-Error	T-Ratio (Prob)
LINF	-2.215593	1.056224	-2.098[.045]
LIR	-1.782095	2.520728	-0.707[.485]
LUNP	4.079647	0.473897	8.609[.000]
LWR	-2.626635	0.534520	-4.914[.000]
C	36.094014	6.186868	5.834[.000]

Table-7: Vector Error-Correction Model (VECM)

ADRL (1,1,1,1,1): Dependent variable is DSAV: Time Period 1972-2020			
Regressor	Coefficients	Standard-Error	T-Ratio (Prob)
D(LWR)	-2.860775	1.409907	-2.029(0.05)
D(LWR(-1))	1.432364	0.734786	1.949(.061)
D(LUNP)	4.978860	1.405231	3.543(.001)
D(LIR)	2.408005	1.530058	1.574(.126)
D(LIR(-1))	3.743585	1.437107	2.605(.014)
D(LINF)	-1.530258	0.649153	-2.357(.025)
ECT	-0.690676	0.149360	-4.624(.000)

Table-8: Diagnostic Test

Breusch-Godfrey Serial Correlation LM Test:	
F-statistic 0.845179	Prob. F(2,27) 0.4405
Obs*R-squared 2.356692	Prob. Chi-Square(2) 0.3078

Heteroskedasticity Test: White			
F-statistic	2.184540	Prob. F(5,36)	0.0775
Obs*R-squared	9.776791	Prob. Chi-Square(5)	0.0818
Scaled explained SS	5.263752	Prob. Chi-Square(5)	0.3845

The table-8 shows the serial correlation and heteroscedasticity test of our model. The results of LM test of residual serial correlation show that there is no serial correlation among the variables. White test for heteroscedasticity is applied which shows that there is no heteroscedasticity problem in our data. The stability of a model tells us that whether our estimated model has been shifted or not over the given time period. Hansen (1996) says that misspecification of model may provide biased results that effects the explanatory power of the results. The Cumulative Sum (CUSUM) and the Cumulative Sum of the Squares (CUSUM sq) tests are used for testing the stability of short run and long run coefficients of the model (Brown, Durbin and Evans, 1975). The results of Cumulative Sum (CUSUM) and the Cumulative Sum of the Squares (CUSUM sq) tests are given in figure-1 and figure-2. The figures show that Cumulative Sum (CUSUM) and the Cumulative Sum of the Squares (CUSUM sq) are in the middle of the two critical lines and does not go outside the critical boundaries. The figures of Cumulative Sum (CUSUM) and the Cumulative Sum of the Squares (CUSUM sq) confirm that the selected model is correctly specified.
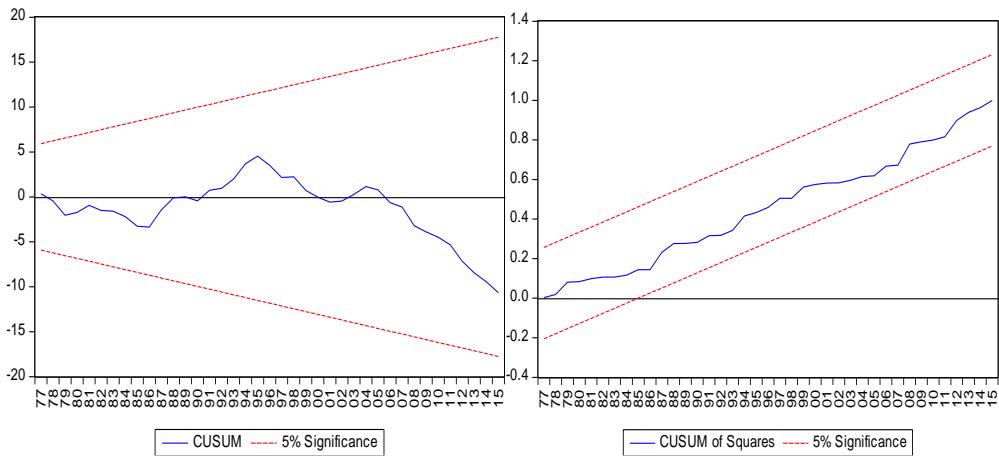
6. Conclusions

The main objective of this study is to examine the domestic saving under interest rate and economic misery of Pakistan. For this purpose, the data from 1972-2013 is used. Inflation, unemployment and worker's remittances are some selected independent variables and domestic savings of Pakistan is dependent variable. This study uses the ADF unit root test for stationarity of the variables. Auto Regressive Distributed Lag (ARDL) model has been used to see the co-integration among the variables of the model and Vector Error-Correction model is used for examining the short run phenomena. The results of unit root test show that there is mixed order of integration among the variables of the model. In long run unemployment has a positive and significant impact on domestic saving. Worker remittances and inflation has a negative and significant impact on domestic saving while, interest rate has a negative and insignificant impact on domestic saving. In short run unemployment is statistically significant and positively affects domestic saving. Worker remittances have a significant but negative impact on domestic saving. Interest rate positively effects domestic saving and has a significant impact. Inflation has negative and significant impact on domestic saving. Moreover, short run deviations in the last period are corrected by (97.206) percent in the next period. These results reveal that economic misery is negatively affecting the domestic saving of Pakistan. On the basis of empirical results, there are some policies suggested to boost domestic saving in Pakistan. As inflation has a negative and significant impact on domestic saving in short and long run so inflation should be controlled through contractionary monetary policy. Economy should not rely on financial liberalization for the growth in saving. In short run interest rate is positively related to domestic saving as people are encouraged to save more as they get higher returns. But opposite case is seen in long run as interest rate is negatively associated with saving but that is statistically insignificant. Government should introduce different schemes for savings such as bonds, shares etc.

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