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An Empirical Analysis of Determinants of Saving in Pakistan

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Abstract:

We applied the ARDL model in order to investigate the long-run and the short-run relationship among Domestic saving (dependent variable), Gross Domestic Product, inflation, foreign direct investment, urban population growth, remittances, tax revenue and broad money (independent variables). Time series Data were obtained from 1976-2017 from the website of World development indicator (WDI). Results of ARDL show that all variables have a significant effect on gross domestic saving in the long-run, but CPI has insignificant effect on gross domestic saving in the long-run. CPI and UPG have a negative relation with gross domestic saving in the long-run while other variables have a positive relation with gross domestic savings in the long-run. Remittances and tax revenue have insignificant effect while other variables have a significant effect on gross domestic saving in the short run. Only urban population growth has a negative effect on gross domestic saving in the short-run. It is recommended that Proper policies may be framed and adopt for financial institutions of the selected countries in the study for the purpose to achieve main goal of economic growth, capital formation. On the other hand Policies of income effect and prices effect should be presented and adopted for constructive changes in behavior of saving.

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Key words: Domestic saving, gross domestic product, broad money, Inflation, remittances, foreign direct investment, tax revenue, ARDL

INTRODUCTION

The saving of government, corporate and household in a country is called gross domestic saving. Government saving, household saving and corporate saving are considered the three main accepted components of National saving. (Khan et al., 2014). According to (Nga, 2007) domestic saving plays a vital and collective role for the sustainability and growth of an economy because it encourage investment eliminate poverty and create employment opportunities for the citizens. Solow (1956) concluded in his research work that growth of economy is influenced by the rate of saving because high rate of saving is important for the economic growth. The economic growth and capital formation is the main goal of every country because citizens of developed countries live with more comfortable and holding a better welfare than the citizens of developing countries. To reduce poverty, unemployment, inflation and to improve the level of per capita income are the main goals of every country.

This research study has focused the gross domestic saving of Pakistan. This study has employed secondary data regarding determinants of gross domestic saving in Pakistan using ARDL model in the research. The data was collected for period of 1976-2017. Literature review related to dependent variable and all independent variables of study was compiled from published research papers and research reports of different research journals etc. The current research has focused gross domestic saving, gross domestic product, broad money, tax revenue, foreign direct investment, remittances, urban population growth and inflation.

Importance of this study arises due to significant role of domestic saving in growth of a nation's economy. Saving has provided important services for individuals of any state. This research study has examined the impact of key elements of domestic saving in Pakistan. This study has provided comprehensive framework and published literature regarding determinants of saving in Pakistan The current study has identified the effect of gross domestic product, age dependency ratio, broad money, tax revenue and inflation on gross domestic saving of the selected countries. This study has evaluated the factors which have provided a ground for further studies on the role of determinants in term of gross domestic saving. The importance of gross domestic saving and its awareness has been recognized on international as well as on national levels because it has played central role in decreasing inflation of a country. In this study, data regarding elements which affect the rate of domestic saving in Pakistan was compiled from secondary sources (Websites of World Bank). The effect of independent variables on dependent variable (Gross domestic saving) was evaluated and analyzed by using and applying ARDL techniques.

Domestic saving has received importance and attention from economists (i.e. research community and academic) due to its important role in economic development. Previously research studies have been conducted by Abbas and Bashir (2010) Chaudhry, Faridi, Abbas and Bashir (2010) Khan et al., (2013), Khan et al., (2014) Ahmad (2015) on this topic of research. Our research study is different from other research studies in term of sample and time.

LITERATURE REVIEW

Abdul-Malik and Baharumshah (2007) reported that countries having higher savings rates are also enjoying the higher growth rate and per capita income. Pakistan is a low income developing

country with weak capital market and highly dependent upon national savings for financing or investment in the country. The population of Pakistan is near about 170 millions and it is also known as lower income country with per capita income of PKR Far East Journal of Psychology and Business Vol 3 No 3 June 2011 63 75066 in 2009 with the 18% increase from previous year. Therefore, the national savings issue has greater importance in the economic growth of Pakistan.

Abbas and Bashir (2010) reported the factors of National Savings for short and long term in Pakistan. Time series data was applied by the author for the period or time from 1972-2008 by using vector error correction model (VECM) and Johansson Co integration method. The descriptive factors that influence the rates of National Savings in long term were price index, interest rate, exports, workers remittance, public loans, consumer and government spending. In long term public loans were inversely connected to rate of saving while interest rates, export, consumer price index, workers remittance and Government spending have vital and constructive or positive effect on rates of national savings. The interest rates and workers remittance was positively related with saving rates for short period.

Chaudhry, Faridi, Abbas and Bashir (2010), examined the determinants of national saving 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.

Khan et al., (2013),) investigated the impact of demographic factors like age, income, decency ratio, education of males and females and the economic factor of financial depth on household savings in Pakistan over the period 1975-2008 by applying cointegration analysis. The study showed that increase in per capita income, expected age, deepening of financial system, increase in years of education of both males and females was positively associated with higher saving rate but increase in dependency ratio had negative impact on saving rate.

Khan et al., (2014), analyzed to examine the impact of interest rate, inflation rate and per capita income on household's saving in Pakistan for the period of 1981 to 2011. This study used Granger causality test, Johansen cointegration and vector error correction model. The empirical results showed that there exist equilibrium in long run relationship among per capita income, inflation, interest rate and household's saving.
Ahmad (2015), examined the determinants of Pakistan's private saving for the period 1972 to 2012. The results suggested that GDP per capita, inflation rate, financial development, dependency ratio and fiscal development had impact on the private saving rate in Pakistan.

METHODOLOGY

In this research study we have collected data from the official website of world bank. Time series data was collected from 1976-2017. ARDL model was applied for the long-run and short-run relationship of dependent and independent variables. In this research study our dependent variable is gross domestic saving while indepent variables are gross domestic product, foreign direct investment, broad money, tax revenue, urban

population growth, remittances and consumer price inflation. Models of the study are given as under:-

$$\Delta GDS_t = \alpha + \sum_{i=1}^{n-1} \alpha_{1i}\Delta GDS_{t-1} + \sum_{i=1}^{n-1} \alpha_{2i}\Delta GDP_{t-1} + \sum_{i=1}^{n-1} \alpha_{3i}\Delta INF_{t-1} + \sum_{i=1}^{n-1} \alpha_{4i}\Delta BM_{t-1} + \sum_{i=1}^{n-1} \alpha_{5i}\Delta FDI_{t-1} + \sum_{i=1}^{n-1} \alpha_{6i}\Delta RMT_{t-1} + \sum_{i=1}^{n-1} \alpha_{7i}\Delta TR_{t-1} + \sum_{i=1}^{n-1} \alpha_{8i}\Delta UPG_{t-1} + \beta_9 GDS_{t-1} + \beta_{10} GDP_{t-1} + \beta_{11} INF_{t-1} + \beta_{12} BM_{t-1} + \beta_{13} FDI_{t-1} + \beta_{14} RMT_{t-1} + \beta_{15} TR_{t-1} + \mu_t \quad 1.1$$

$$\Delta GDS_t = \alpha + \sum_{i=1}^{n-1} \alpha_{1i}\Delta GDS_{t-1} + \sum_{i=1}^{n-1} \alpha_{2i}\Delta GDP_{t-1} + \sum_{i=1}^{n-1} \alpha_{3i}\Delta INF_{t-1} + \sum_{i=1}^{n-1} \alpha_{4i}\Delta BM_{t-1} + \sum_{i=1}^{n-1} \alpha_{5i}\Delta FDI_{t-1} + \sum_{i=1}^{n-1} \alpha_{6i}\Delta RMT_{t-1} + \sum_{i=1}^{n-1} \alpha_{7i}\Delta TR_{t-1} + \sum_{i=1}^{n-1} \alpha_{8i}\Delta UPG_{t-1} + \eta 1 ECT_{t-1} + \mu_t \quad 1.2$$

RESULTS AND DISCUSSIONS

Table 1: Unit Root Test

	ADF		Phillips-Perron	
Level				
Variables	**Intercept**	**Trend & Intercept**	**Intercept**	**Trend & Intercept**
GDS	-1.5435 (0.5018)	-1.3417 (0.8629)	-1.4522 (0.5474)	-1.212338 (0.8946)
BM	1.2625 (0.6377)	-3.7066 (0.0334)	-1.1526 (0.6855)	-2.860767 (0.1853
CPI	-3.2063(0.0268)	-3.1689(0.1048)	-3.2154 (0.0262)	-3.179734 (0.1026)
FDI	-2.8719 (0.0576)	-3.2198 (0.0951)	-1.9317 (0.3150)	-1.953243 (0.6087)
GDP	-4.6860 (0.0005)	-4.7326 (0.0024)	-4.6540 (0.0005)	-4.732648 (0.0024)
RMT	-1.5689 (0.4891)	-1.6725 (0.7453)	-1.8715 0.3420)	-2.015173 (0.5759)
TR	-0.8611 (0.7901)	-3.0243 (0.1382)	-1.2707 (0.6340)	-2.953717 (0.1573)
UPG	-1.1450 (0.6884)	-1.5290 (0.8026)	-0.6373 (0.8509)	-1.305998 (0.8724)
First Difference				
GDS	-7.3189 (0.0000)	-7.4041 (0.0000)	-7.3189 (0.0000)	-7.458312 (0.0000)
BM	-5.4799 (0.0000)	-5.4280 (0.0004)	-6.7828 (0.0000)	-6.964812 (0.0000)
CPI	-7.4087(0.0000)	-7.2799 (0.0000)	-7.4087 (0.0000)	-7.279965 (0.0000)
FDI	-4.2850(0.0016)	-4.2438 (0.0091)	-4.2513 (0.0017)	-4.206561 0.0100)
GDP	-10.225 (0.0000)	-10.0895 (0.0000)	-13.1451 (0.0000)	-12.97167(0.0000)
RMT	-5.9876 (0.0000)	-5.9272 (0.0001)	-6.0377 (0.000)	-5.947035 (0.0001)
TR	-8.0646 (0.0000)	-8.1783 (0.0000)	-8.0765 (0.0000)	-8.262981 (0.0000)
UPG	-3.5172 (0.0125)	-3.5458 (0.0479)	-0.6373 (0.8509)	-3.545819 (0.0479)

In this study, we used ADF and PP for checking Stationarity of the data. According to the above table, results CPI and GDP are stationary at level. However the remaining variables are not

stationary at level. All the variables are stationary at first difference.

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	-561.3009	NA	318.0188	28.46504	28.80282	28.58717
1	-321.1837	372.1816	0.050734	19.65919	22.69917*	20.75835
2	-230.9344	103.7868*	0.020326*	18.34672*	24.08891	20.42291*

The above table indicates the results for lag determination for ARDL model. The results of the above indicates that Lag one is the best lag for ARDL model with Schwarz information criterion.

Table 3: Serial Correlation LM Test and Heteroskedasticity Test:

Breusch-Godfrey Serial Correlation LM Test			
F-statistic	1.622365	Prob. F(2,32)	0.2133
Obs*R-squared	3.866640	Prob. x^2 (2)	0.1447
Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	1.006666	Prob. F(7,34)	0.4438
Obs*R-squared	7.210329	Prob. x^2(7)	0.4073

The results of above table indicated that there is no serial correlations and Heteroskedasticity in the data because the P values of both test are is greater than 0.05.

Table 4: ARDL Bounds Test

Null Hypothesis: No long-run relationships exist

Test Statistic	Value	Significance Level	I(0) Bound	I(1) Bound
F-statistic	6.601253	10%	2.03	3.13
		5%	2.32	3.5
		2.5%	2.6	3.84
		1%	4.26	4.26

The above table indicates the results of ARDL Bounds test. According to ARDL bound test results there is a long run

relation among dependents and independent variables because the value of F-statistics is greater than upper bound.

Table 5: Long Run Coefficient Dependent Variable: Domestic Saving Selected Model: ARDL (1,0,0,1,0) Based on Schwarz Bayesian Criterion

Regressors	Coefficient	Standard Error	T-Ratio	Prob
GDP	0.346168	0.171134	2.022790	0.0454
FDI	1.352619	0.597585	2.263476	0.0338
CPI	-0.071359	0.098096	-0.727435	0.4746
BM	0.562480	0.131745	-4.269477	0.0003
REMITT	0.722107	0.223777	-3.226903	0.0039
TR	1.305972	0.412138	3.168776	0.0044
UPG	-5.799124	1.178448	-4.920983	0.0001
C	43.410709	8.507040	5.102916	0.0000
R-Squared	0.769422		**R-Bar-Squared**	0.591249
Residual Sum of Squares	36.43931		**DW-statistic**	2.246936
Akaike Info. Criterion	3.644646		**Schwarz Bayesian Criterion**	4.404642

According to the above table gross domestic product, foreign direct investment, broad money, tax revenue, remittances and urban population growth have significant effect on gross domestic saving in the long run while inflation have insignificant effect on gross domestic saving in the long-run. Consumer price inflation and urban population growth have a negative relatons with the gross domestic saving in the long run while gross domestic product, foreign direct investment, broad money, tax revenue, remittances have positive relations with gross domestic saving in the long run.

Table 6: Short Run Coefficient for the Selected ARDL (1,0,0,1,0) Selected based on Schwarz Bayesian Criterion

Regressors	Coefficient	Standard Error	T-Ratio	Prob
GDP	0.332865	0.169639	1.962190	0.0425
FDI	2.450430	0.704585	-3.477836	0.0021
CPI	0.249626	0.104862	2.380526	0.0264
BM	0.469302	0.120156	3.905784	0.0008
RMT	0.522340	0.294455	1.773920	0.0899
TR	0.147599	0.383164	0.385210	0.7038

UPG	-5.576267	1.193004	-4.674140	0.0001
CointEq(-1)	-0.961570	0.138118	-6.961964	0.0000
R-Squared	0.948361		**R-Bar-Squared**	0.908458
Akaike Info. Criterion	3.462391		**Schwarz Bayesian Criterion**	4.222386
DW-statistic		2.497942		

According to the above table gross domestic product, foreign direct investment, broad money, and urban population growth and inflation have significant effect on gross domestic saving in the short-run while tax revenue and remittances have insignificant effect on gross domestic saving in the short-run. All variables have positive relations with gross domestive saving in the short-run but urban population growth have negative relation with the gross domestic saving.

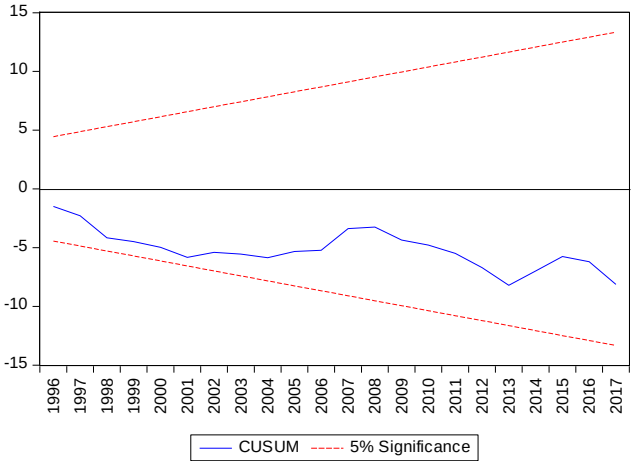

Figure 1: According to the above figure our model is stable as the blue line lies between green and red line.

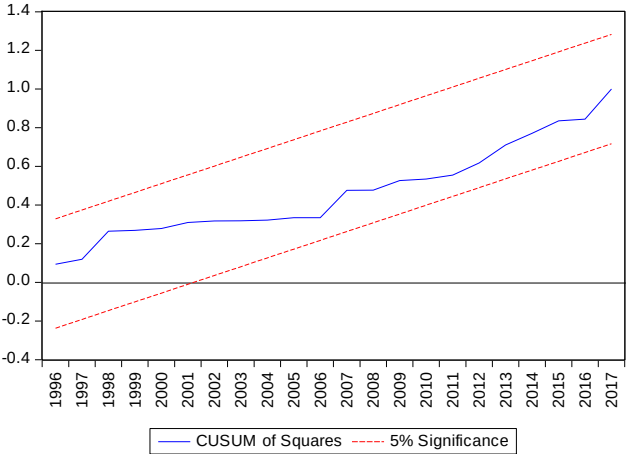

Figure 2: According to the CUSUM of squares figure the blue line lies between the two red and one green line which indicates that our model is stable.

CONCLUSIONS & RECOMMENDATIONS

This research study "An Empirical Analysis Of Determinants Of Saving In Pakistan" was aimed to examine the important determinants of gross domestic saving in Pakistan from 1976-2017 using ARDL model. We applied ARDL model in order to investigate the long-run and short-run relationship among Domestic saving (dependent variable), Gross Domestic Product, inflation, foreign direct investment, urban population growth, remittances, tax revenue and broad money (independent variables). Time series Data were obtained from 1976-2017 from the website of World development indicator (WDI). Results of ARDL show that all variables have a significant effect on gross domestic saving in the long-run, but CPI has insignificant effect on gross domestic saving in the long-run. CPI and UPG havea negative relation with gross domestic saving in the long-run while other variables have positive relation with gross domestic saving in the long-run. Remittances and tax revenue have insignificant effect while other variables have a significant effect on gross domestic

saving in the short run. Only urban population growth has a negative effect on gross domestic saving in the short-run.

Based on the outcome of this study, the major recommendations are presented as under:

It is suggested that in future research scholars may use primary data for research studies on the topic of gross domestic saving because the primary data will depict accurate impact of the determinants on gross domestic saving in Pakistan. Maximum independent variables will generate more valuable and accurate reports which may improve understanding on the subject as well as quality of future research studies.

Proper policies may be framed and adopt for financial institutions by the selected countries in the study for the purpose to achieve main goal of economic growth, capital formation. On the other hand Policies of income effect and prices effect should be presented and adopted for constructive changes in behavior of saving.

The government of Pakistan may also adopt different kinds of policies for stimulating investment, encourage saving and increase production in order to achieve the goal of economic growth.

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