

## **Impact of Different Political Regimes on Agriculture Sector Growth: A Cointegration Analysis**

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### **Abstract**

The objective of this study is to investigate the macroeconomic performance of agriculture sector in various regimes for the year 1950 to 2010 employing ARDL, and ECM. After examining macroeconomic performance of agriculture sector of Pakistan, under alternative political setup that is dictatorship and democracy, it is concluded that, the type of associations between alternative political setup and economic development and growth resists the finding established that both political setup promote the economic growth and development of agriculture sector of Pakistan. Under interesting conditions of Pakistan, the connection amongst economic development and growth and the democratic system is ambiguous and inexplicit. Pakistan's economic growth and development has been better with tyrannical political administrations than democracy and the causative association amongst democratic system and economic aspects, as laid out by Huntington, can't be shown on account of Pakistan. Keeping all these proofs and evidences in mind, it cannot be forecasted that the democracy or dictatorship is beneficial for Pakistan. It is generally perceived that long span of political regime and international shock can contribute better economic growth. It is concluded that politics does matter, however "regimes" don't catch the suitable differences. Politics matter rather than the type of the government system.

**Keywords:** macroeconomic performance, agriculture sector, ARDL, ECM, political regimes, economic growth.

### **1. Introduction**

Starting from the initial point of politics in ancient times, the most discussed themes of comparative politics and political theory are political regimes, i.e. democracy, dictatorship, and monarchy, republic and communism and changes in these regimes. The political regimes and their social as well as economic impacts in Pakistan across the sixty-eight years are a variety of contradictions. Since 1947 the annual growth rate of the economy averaged 5.17%, very few countries achieved this milestone. There are so many factors that made Pakistan, politically unstable as well as volatile, in which regional economic disparities, religious fundamentalism, ethnic cleavages and sectarianism are the most important factors. Pakistan is still unable to recognize its economic and political potential

as a result of that several East Asian nations have risen and moved very much ahead in most social, economic as well as political indicators that were far behind Pakistan in decades of the 60s and the 70s. Most political and economic experts considered that stable political conditions are necessary for fast economic growth; however, the case of Pakistan is totally opposite in the sense that the political conditions of Pakistan have never been very stable and, the average rate of growth of the economy is 5.17% from 1947, that is conventional and contradicts with the theories. With the objective of explaining these contradictions as well as paradoxical situations, this work tries to deal with both the views that are; the economic performance of democratic regime and the economic performance of the military regime distinctly.

Investigating the historical background of Pakistan, the example of government appears to be uniform and no serious endeavor was made to support economic and financial development and growth remarkable. The division of the diverse periods is given as under:

The most essential component of the economy of Pakistan is the agriculture sector, which is currently providing 21% share in Gross Domestic Product. Almost 60% of rural population totally depends upon agriculture sector for its living as well as this sector provides 45% employment to the labour force of this country. Agriculture sector plays a very vital function for generating growth for the economy, it helps in poverty reduction, for providing bases for the transforming towards industrialization, also provide important raw materials for the industry and last but not the least agriculture sector ensures the food security for the people of Pakistan. Different democratic and dictatorship regimes are influenced to enhance the life quality of the individuals and to reduce hunger, poverty and famine from the economy through inducing agriculture a productive, profitable and efficient sector of the country.

Agriculture community of Pakistan comprises of small farmers featuring several restrictions in their daily farming that have been transformed into the reality that yield each person level in the country has been placed in the lower middle ranged country accomplishing the tendency to provide the requirements of food to its rising population and with the present speed of growth and development imagines to slide to the lower placed countries holding ability to provide the nutrition requirements of its population near 2030.

The concepts and methods used in this study can be gainfully employed for similar studies elsewhere in the world especially in the Third World countries which have been governed, both by the democratic and non-democratic rulers.

The study would be initiated to cover the following periods:

1958-71 - General Ayub and General Yahya Periods

1972-77 - Zulfiqar Ali Bhutto's Period

1977-85 - General Zia's Period.

1985-99 - Democratic rule which has seen nine changes in government

1999-02 - General Pervez Musharraf's Period.

2002-07 - Jamali and Shaukat Aziz Period

The main contribution of this study is to empirically estimate the impact of different political regimes on the agriculture sector of Pakistan for the year 1950 to 2010 employing Auto-Regressive Distributed Lag model. The study focuses on the dynamics of political regimes and the macroeconomic performance of the agriculture sector of Pakistan. The hypothesis that are tested for the study is: Political regimes that is democracy or dictatorial regimes impact the agriculture sector?

The remaining part of this study is structured into five sections. The second section establishes theoretical background and framework and review of previous literature in the perspective of Pakistan and world. The third section presents the methodological framework. It develops the empirical model that is used in this study. The fourth section provides the empirical analysis and outcome of the study in the perspective of Pakistan. The fifth section concludes the study and provides policy implications with respect to Pakistan. Last section depicts the Reference.

## **2. Review of Literature**

In this section we are going to critically review the current research writing on the topic of interrelatedness in the middle of the political regime and the growth of the economy and to distinguish the routes or paths by which the political regime influences the growth of the economy. Fundamentally the three doctrines with respect to the interrelatedness in the middle of the growth of the economy and political regime (Sirowy et al., 1990; Helliwell, 1994; and Feng, 1997) are examined.

There are a few lists of characteristics, whether few nations are dictatorship based or democratic based. Initially, the Freedom House index by Gastil, which gives the data spanning from early 70's to middle 90's, employs the governmental rights or the 'political rights' and common freedoms as the pointers of political regime (Helliwell, 1994; Barro, 1996, 1999; Minier, 1998; Nelson and Singh, 1998; Tavares and Wacziarg, 2001; Batiz, 2002; and Polteravich and Popov, 2007). The fundamental idea of 'political rights', which is utilized through Freedom House are "rights to partake defined in the political procedure, and on democratic system the privilege of all adults to vote and contend for open office, and for choose agents to have an unequivocal vote on governmental strategies". However, 'common freedoms' can be characterized as "rights to free expression, to arrange or illustrate, and additionally rights to a level of self-governance, for example, is given by opportunity of religion, education, travel, and other individual rights" (Barro 1999). Second, the index of Bollen, which gives a data set of 1960, 1965 as well as 1980, employed the similar variables as the index of Gastil and characterized dictator and majority rule administrations (Muller, 1995; Barro, 1996, 1999). Third, the Polity index of Gurr incorporates four variables to compute the democratic system, which are intensity of the act of sharing in the political activities of a political group, effectiveness of official enlistment, honesty of official enrollment, and presence of restriction on the chairman of the political group. This list proposes a data set span from 1960 to 1980 (Feng, 1997; Leblang, 1997; Gupta, Madhavan and Blee, 1998; Baum and Lake, 2003; Pumpler and Martin, 2003; Krickhaus, 2006; Kisangani 2006). Fourth, the index of Democratic Responsibility gives a data set span from 1984 to 2003 and assesses how responsive a

legislature is to its kin (Tang and Yung, 2005). Fifth, the index of Arat gives a data set span from 1950 to 1982 and assesses the idea of governmental control of the administration through utilizing four variables, which are supported, comprehensiveness, effectiveness, and common freedoms (Heo and Tan, 2001). Sixth, the index of Gasiorowski has four classifications of nations which are democracy, semi-democratic, tyranny, and transitional administrations as well as giving a data set span from 1961 to 1992 (De Haan and Siermann, 1995). Seventh as well as final, an index of Political Repression gives a data set span from 1984 to 1986 as well as characterizing human rights attribute to quantify political freedom (Pourgerami, 1988).

There is a discussion among financial and economic experts over the association in the middle of economic performance and development of the economy (for example, Tang et al., 2005; Heo et al., 2001). A few financial and economic experts and specialists have determined that the association is direct between them, however, others contended that it is an inverse association. Feng (1997), De Hann et al. (1995) and Helliwell (1994), who took after a contention via Sirowy et al. (1990), support the thought that there are three different philosophies on the association in the middle of economic growth and development and democratic system.

Development and growth of the economy and democracy likewise have a solid inverse association by few routes (Tavares et al., 2001). The routes by which democratic system affects the development and growth of the economy are human capital, instability in the politics, and nature of government, the size of the government, inequality or imbalances in the income, openness or liberalization of trade, aggregation of the physical capital, and investment or finance. Then again, the routes by which development and growth of the economy influence democratic system on a converse association are investments as well as education.

The most vital and first route by which democratic system affects the development and growth of the economy is human capital. Tavares et al. (2001) contended that human capital is an essential and vital route of causality from the democratic system for the development and growth of the economy. The democratic systems are receptive to the fundamental necessitates of residents and have a tendency to pick arrangements to advance the accumulation of human capital, in this manner, it influences the development and economic growth (Perroti, 1996; Barro, 1996; Minier, 1998; Baum et al., 2003). Baum et al. (2003) likewise determined that the democratic system has a solid direct effect on economic development through enhancing a specific pointer of formation of human capital. Their observational discoveries propose that the democratic system among poor nations enhances expectancies of life, however, in non-developing nations the impact is factually insignificant. Therefore, expectancies of life has a direct and noteworthy impact on the development and growth of the economy just in developing nations. Nevertheless, the increment in the democratic system among non-developing nations enhances education and, consequently, it increments the development and growth of the economy; however the impact is not huge in developing nations (Leblang, 1997; Helliwell, 1994; Baum and Lake, 2003). This is on the grounds that democratic foundations are receptive to the requirements of the destitute individuals to grow their entrance to longer expectancies of life principally and requirements of the rich individuals to achieve an advanced level in education.

Feng (1997) determined that the defenders of this philosophical system accept that the democracy exclusively is not of an incredible significance to contribute impact on the development and growth process of the economy, on the grounds that the most critical component is the structure of institution (two political groups against political groups) and government improvement methodologies (export advancement against import substitution). Sen (1999) additionally guarantees that the democratic system encourages the ascent of free individuals, particularly business people and corporate administrators, whom by utilizing their key and hierarchical decision make a nation strong with respect to performance of the economy. Notwithstanding, if this status is not accomplished, it is not good to associate the democratic system to the development and growth process of the economy. This doctrine likewise demonstrates that distinctive frameworks of politics can embrace the similar economic arrangement; accordingly the impact of framework of politics on the development and growth process of the economy is irrelevant (Feng, 1997).

Nagy (2015) dealt with the administration of the extraordinary debts that advanced as a result of financing gave both by the banks and the integrators, since the improvement and the administration of the cases and non-exhibitions are essentially free of the type of subsidizing. Hence one of the significant issues in this field is the improvement of extraordinary obligations and their suitable administration.

Baklouti and Boujelbene (2016) planned to evaluate an econometric model whereby the interrelationship amongst vote based system and financial development can be altogether examined. For this reason, dynamic synchronous condition board information models have been connected to 12 MENA nations contemplated over the period 1998– 2011. The achieved experimental outcomes have uncovered that a bi-directional causal relationship seems to hold on amongst majority rules system and monetary development.

Amir-ud-Din and Khan (2017) investigated the collaboration among vote based system, wage disparity and monetary development amid 1963-2016 utilizing 3SLS and elective estimation techniques. Their discoveries propose that majority rules system, salary imbalance and monetary improvements are endogenously interlinked in Pakistan. The importance of this examination lies in the way that it features the inborn estimation of the political organizations and their generous part in advancing monetary development and lessening disparity.

Dastagiri and Vajrala (2018) focused in this paper is to contemplate the impacts of political economy on agribusiness, agriculturists, consumer wellbeing and economic development. The investigation found that, plainly agribusiness comprehensively isn't on the need list for the nearby focal governments in assigning their financial plans towards horticulture. The examination recommends that, financial disapproved of legislators and political disapproved of market analysts who knows about social, political and monetary frameworks are required in effective financial arrangement of horticulture.

In light of factual regressions ran by Helliwell (1994), Nelson et al. (1998), Heo et al. (2001) and Polterovich et al. (2007) discovered confirmation that the democratic system does not experience any measurable effect on the development and growth process of the economy in a few nations, for example, Argentina, Brazil, Honduras, Pakistan, Panama,

Peru, Sri Lanka and Tahiti. There are no statistically substantial or noteworthy impacts in few nations in Africa too (Kisangani, 2006).

### 3. Methodology

The study is conducted by using secondary data and sources such as papers, economic journals, government publications, reports of the state bank, World Bank studies/reports, statistical data published by different sources, are used to obtain relevant research matter and data.

#### 3.1 Empirical Approaches

The time series data is employed for the purpose of analysis span from 1960 to 2010. In this study, therefore, it is absolutely essential to examine scientifically the stationarity of the said data, for the reason that, without checking the stationarity, the result may be misleading and unauthentic. Unit root tests are employed to test the stationarity of the time series data. Unit root tests are used to assure the stationarity of the time series data in this study. Further choices of empirical tests depend upon the stationarity of the data.

#### 3.2 Dickey-Fuller Test

Fuller and Dickey jointly developed a test Dickey-Fuller test in 1979 that test the null hypothesis whether delta is equal to zero or not  $\delta = 0$ . The estimated t-value of the  $Y_{t-1}$  in (03) follows the  $\tau$  statistics. The critical values of  $\tau$  statistics calculated on the basis of Monte Carlo simulation. If the null hypothesis that  $\delta = 0$  is not admitted specifically, the time series data does not have unit root.

#### 3.3 Augmented Dickey-Fuller (ADF) Test

Augmented Dickey-Fuller (ADF) test was developed by Dickey and Fuller in 1979 which is built to take care of autocorrelation of  $u_t$ . In simple Dickey-Fuller test assumed that  $u_t$  is not auto-correlated, but in practical work it is general cases there is autocorrelation exist in  $u_t$ . In Augmented Dickey-Fuller test all the previous equations are added. The following equation is the equation of augmented Dickey-Fuller test model:

$$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \alpha_i \sum_{i=1}^m \Delta Y_{t-i} + \varepsilon_t \quad (05)$$

Where  $\Delta Y_{t-1} = Y_{t-1} - Y_{t-2}$ ,  $\Delta Y_{t-2} = Y_{t-2} - Y_{t-3}$  and so on. In above equation  $\varepsilon_t$  is a normally distributed error term which is not auto-correlated. The lagged difference terms are added up to the point where the error term in equation (05) is serially uncorrelated. The null hypothesis of Dickey-Fuller and Augmented Dickey-Fuller is same, so the critical values of both above tests is same.

#### 3.4 ARDL Bound Testing Approach for Cointegration

Pesaran and Shin (1998) developed the ARDL Bound Testing Approach for Cointegration to check the long run relation between dependent and independent variables. One of the most appealing features of the ARDL Bound Testing Approach for Cointegration that it never required variables that is employed in the study must be same order stationary and second most appealing features of the ARDL Bound Testing Approach for Cointegration that it is equally beneficial if the sample size is small. While different other Cointegration techniques like for example Johansen Cointegration test, necessarily required that all the variables that is employed in the study must be same order stationary and they are sensitive

to the size of the sample data. ARDL approach is employed if some variables are stationarity at level and some variables are stationary at first difference or the entire variables are stationarity at level or at first difference. Furthermore, the ARDL Bound Testing Approach for Cointegration technique incorporate sufficient lags of dependent and independent variables to limit the process of data generation to make the modeling structure from general to specific. This technique also takes care of the issue of omitting variable case as well as the problem of autocorrelation; as a result of that it provides the non-spurious as well as reliable estimates.

To check the long run association between dependent and independent variables the joint test of significance of the ARDL Bound Testing Approach for Cointegration technique is employed in which the null hypothesis is the entire Cointegration coefficients are equal to zero.

### 3.5 Error Correction Model

The model ECM or the Error Correction Model is a multiple time series model, generally employed for variables are co integrated or have the long run association. Theoretically, the Error Correction Model is employed to estimating the short, as well as the long run influence of independent variable(s) on dependent variable. The exogenous shocks to the equilibrium of the long run model which create deviation or simply called the error explain the dynamics of the shot run model. The speed of adjustment at which the dependent variable of the model came back to its long run equilibrium from the short run or after the exogenous shocks is directly computed by the Error Correction Model.

### 3.6 Model Specification

We employ the ARDL and ECM technique to forecast the economic performance of Pakistan. There are four models estimated in this study to check the impact of political regimes on the economic performance of Pakistan across the sectors, employing time series data span from 1960-61 and 2009-10.

The ARDL model is as follows:

$$\ln AO_t = f(ALLA_t, \ln WA_t, \ln LBA_t, \ln IMSE_t, \ln FER_t, DEM_t, U_t)$$

Where the dependent variable Agriculture Output is represented by  $(\ln AO_t)$ , the variable Agricultural Land is symbolized by  $(\ln ALLA_t)$ , the variables Water Availability is presented by  $(\ln WA_t)$ , the variable Loan provided by the Agriculture development bank is represented by  $(\ln LBA_t)$ , the variable Improved Seeds is symbolized by  $(\ln IMSE_t)$ , the variable Fertilizer is represented by  $(\ln FER_t)$  and the Dummy variable Democracy in Pakistan is proxy by  $(DEM_t)$ .

## 4. Empirical Results and Findings

The most essential component of the economy of Pakistan is the agriculture sector, which is currently providing 21% share in Gross Domestic Product. Almost 60% of rural population totally depends upon agriculture sector for their living as well as this sector provides 45% employment to the labour force of this country. Agriculture sector plays a very vital function for generating growth for the economy, it helps in poverty reduction,

for providing bases for the transforming towards industrialization, also provide important raw materials in the industry and last but not the least agriculture sector ensure the food security for the people of Pakistan. Different democratic and dictatorship regimes are influenced to enhance the life quality of the individuals and to reduce hunger, poverty and famine from the economy through inducing agriculture a productive, profitable and efficient sector of the country.

The agriculture sector is a critical element of the economy of Pakistan as it furnishes the inputs to down the line manufactures as well as assists in the alleviation of poverty. As discussed earlier, this segment of the economy added 21% of GDP as well as it stays far and away the most prominent employer fascinating 45% of total labour force of the country. Favorable weather conditions are considered as necessary for the growth of the agricultural sector. Agriculture, weather, temperature, rainfall, flood and other aspects of climate are strongly associated that eventually influence the economic performance as well as the production of agriculture sector, prices of agriculture sector and finally economic growth of agriculture sector. The up-and-coming national food security challenges and change in the climate have changed the focus of the policy worldwide in the directions of the agriculture sector development for the past few years. The great possibility of the agriculture sector in making a worthwhile foreign exchange has been significantly recognized by tapping the potential value addition sectors.

The both types of government that is dictator and democratic focused on improving the productivity of the agricultural sector through enhancing yield per acre, better input application and latest technology to heighten profitableness for the farmers, get better competitiveness as well as guarantee the ecological agriculture sustainability. The general aim is to accomplish a continued agriculture rate of growth of 4% to 5% per year to defend the general growth of GDP course.

**Table 1: Unit Root Test (ADF)**

Variables	Cal. Value	1% Critical value	5% Critical value	Prob.
<i>ln AO</i> (3)	-3.175495	-4.165756	-3.508508	0.1018
$\Delta(\ln AO)$ (0)	-5.900719	-4.156734	-3.504330	0.0001
$\Delta(\ln AO, 2)$ (1)	-9.285397	-4.165756	-3.508508	0.0000
<i>ln ALLA</i> (3)	-4.159964	-4.165756	-3.508508	0.0102
$\Delta(\ln ALLA)$ (0)	-12.39533	-4.156734	-3.504330	0.0000
$\Delta(\ln ALLA, 2)(1)$	-11.57080	-4.165756	-3.508508	0.0000
<i>ln WA</i> (0)	-2.968020	-4.152511	-3.502373	0.1513
$\Delta(\ln WA)$ (1)	-7.109938	-4.161144	-3.506374	0.0000
$\Delta(\ln WA, 2)$ (6)	-4.125660	-4.192337	-3.520787	0.0119
<i>ln LBA</i> (0)	-2.212972	-4.152511	-3.502373	0.4722
$\Delta(\ln LBA)$ (0)	-6.428655	-4.156734	-3.504330	0.0000
$\Delta(\ln LBA, 2)$ (1)	-9.141902	-4.165756	3.508508	0.0000
<i>ln IMSE</i> (0)	-5.993449	-4.152511	-3.502373	0.0000
$\Delta(\ln IMSE)$ (1)	-7.164340	-4.161144	-3.506374	0.0000
$\Delta(\ln IMSE, 2)(3)$	-7.208857	-4.175640	-3.513075	0.0000
<i>ln FER</i> (7)	-6.814070	-4.186481	-3.518090	0.0000
$\Delta(\ln FER)$ (0)	-8.340007	-4.156734	-3.504330	0.0000
$\Delta(\ln FER, 2)$ (1)	-12.54357	-4.165756	-3.508508	0.0000
<i>ln DEM</i> (0)	-2.344996	-4.152511	-3.502373	0.4029
$\Delta(DEM)$ (0)	-6.813627	-4.156734	-3.504330	0.0000
$\Delta(DEM, 2)$ (1)	-7.966045	-4.165756	-3.508508	0.0000

Notes: Y: The Level form of the variable Y,  $\Delta(Y)$ : The first difference of the variable Y.  $\Delta(Y, 2)$ : The second difference of the variable Y.

As talked about in earlier chapters, ADF is employed to estimate the stationary of the data which is either the time lag effect, terminated or not, from variables used in this study.

The table number 1 depicts the outcomes of the ADF test. The variables, Agriculture output ( $\ln AO_t$ ), Water availability ( $\ln WA_t$ ), Loan provided by the Agriculture development bank ( $\ln LBA_t$ ) and Dummy variable Democracy ( $DEM_t$ ) are non stationary at a level which is shown by their respective probability values and the calculated t-statistics values are less than the critical values, all these variables are stationary at first difference.

With the help probability values and the calculated t-statistics values it can be observed that variables Agricultural land ( $\ln ALLA_t$ ), Improved Seeds ( $\ln IMSE_t$ ) and Fertilizer ( $\ln FER_t$ ) are stationary at level.

**Table 2: Lag Length Selection**

<b>VAR Lag Order Selection Criteria</b>						
<b>Lag</b>	<b>LogL</b>	<b>LR</b>	<b>FPE</b>	<b>AIC</b>	<b>SC</b>	<b>HQ</b>
0	139.5201	NA	2.53e-13	-9.1393	-8.8092	-9.0359
1	351.1573	306.5090	3.78e-18	-20.3556	-17.1035	-19.5287
2	424.7841	71.0880*	1.35e-18*	-22.0540*	-17.7153*	-20.5036*
* indicates lag order selected by the criterion						

\*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 outcome of the ARDL model for long association is unique if the lag order of the variables is correct between above chosen dependent variable and independent variables.

The F-statistics explicated by Pesaran et al. (2001) moreover relies on the lag length selection criterion. Consequently, it is appropriate to choose the correct number of lag order of all variables to achieve fair F-statistical value. There are so many tests that are specified in Table-2 and 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 are indicated that the lag length selection is depending on the lowest value which suggests two lags only.

**Table 3: The ARDL Co-integration Analysis**

Estimated Model	$\ln AO_t = f(ALLA_t, \ln WA_t, \ln LBA_t, \ln IMSE_t, \ln FER_t, DEM_t, U_t)$	
Optimal lag structure	(1,0,2,0,1,1,1)	
F-statistics	5.3413	
Significant level	Critical values ( $T = 48$ ) <sup>#</sup>	
	Lower bounds, $I(0)$	Upper bounds, $I(1)$
5 per cent	3.2434	4.5203
10 per cent	2.7809	3.9521
$R^2$	0.99934	
$Adj - R^2$	0.99909	
F-statistics F(13,34)	3962.1[0.000]	
Durbin Watson Test	2.0538	
Diagnostic tests	F-statistics (Prob. value)	
$\chi^2 NORMAL$	1.2598[0.533]	
$\chi^2 SERIAL$	0.12841[0.722]	
$\chi^2 ARCH$	1.1211[0.295]	
$\chi^2 RAMSEY$	1.2598[0.533]	
$\chi^2 NORM$ is for normality test, $\chi^2 SERIAL$ for LM serial correlation test, $\chi^2 ARCH$ for autoregressive conditional heteroskedasticity, $\chi^2 WHITE$ for white heteroskedasticity and $\chi^2 REMSAY$ for Resay Reset test.		

Table-3 demonstrates the statistics of F-test of the ARDL model for long run connection explained by Pesaran et al. (2001). The critical bounds used for this study developed by Narayan (2005). The critical bounds developed by Narayan (2005) are more accurate for the small size samples in comparison of the critical bounds prepared by Pesaran et al. (2001). The results of this model suggest that the estimated F-statistics are more than the upper critical bound with the 5% significance level employing Agriculture output ( $\ln AO_t$ ) as predicted variable. The results support the long run association's existence between the Agriculture output ( $\ln AO_t$ ) as predicted variable and Water availability ( $\ln WA_t$ ), Loan provided by the Agriculture development bank ( $\ln LBA_t$ ), Dummy variable Democracy ( $DEM_t$ ), Agricultural land ( $\ln ALLA_t$ ), Improved Seeds ( $\ln IMSE_t$ ) and Fertilizer ( $\ln FER_t$ ) as independent variables. In other words, these variables are cointegrated in case of Pakistan over the specified period in this study.

The diagnostic tests for the regression problem demonstrate that the model does not have serial correlation nor does the models have autoregressive conditional hetero skedasticity.

The statistics of the Ramsey Reset test indicate that the estimated ARDL model is correctly specified.

**Table 4: Autoregressive Distributed Lag Estimates**

Dependent Variable = $\ln AO_t$			
Regressor	Coefficient	Standard Error	t-Stat [Prob]
$\ln AO_{t-1}$	0.71005	0.095705	7.4192[.000]
$\ln ALLAt$	0.90427	0.53188	1.7001[.098]
$\ln WA_t$	0.12416	0.20803	.59682[.555]
$\ln WA_{t-1}$	0.40211	0.23211	1.7324[.092]
$\ln WA_{t-2}$	0.63466	0.1828	3.4719[.001]
$\ln LBA_t$	0.00479	0.025895	.18497[.854]
$\ln IMSE_t$	0.068098	0.049288	1.3817[.176]
$\ln IMSE_{t-1}$	0.09373	0.047129	1.9888[.055]
$\ln FER_t$	-0.029635	0.069812	-0.42449[.674]
$\ln FER_{t-1}$	0.13945	0.067928	2.0530[.048]
$DEM_t$	-0.061167	0.03525	-1.7352[.092]
$DEM_{t-1}$	0.066614	0.030654	2.1731[.037]
<b>Intercept</b>	0.31255	1.9612	.15937[.874]
<b>Trend</b>	0.036796	0.012223	3.0104[.005]
<b>R<sup>2</sup></b>	0.99934	<b>Adjusted R<sup>2</sup></b>	0.99909
<b>DW-statistic</b>	2.0538	<b>F-Stat. F(13,34)</b>	3962.1[.000]

Table 4 depicts the outcomes of Autoregressive Distributed Lag Estimates. This Autoregressive Distributed Lag model is also picked out on the bases of SC Criterion. The described Autoregressive Distributed Lag regression model in Table-4, Agriculture output ( $\ln AO_t$ ) is used as predicted variable. As it can be observed from the table that the F-statistics of above regression are 3962.1 with p-value 0.000 and R-square ( $R^2$ ) is 0.99934 and Adjusted R-square (Adjusted  $R^2$ ) is 0.99909.

**Table 5: Estimated Long Run Coefficients using the ARDL Approach**

Dependent Variable = $\ln AO_t$			
Regressor	Coefficient	Standard Error	t-Stat [Prob]
$\ln ALLA_t$	3.1187	1.9536	1.5963[.120]
$\ln WA_t$	-0.3738	0.73816	-.50640[.616]
$\ln LBA_t$	0.01652	0.08807	.18758[.852]
$\ln IMSE_t$	0.55812	0.23861	2.3391[.025]
$\ln FER_t$	0.37875	0.16547	2.2889[.028]
$\ln DEM_t$	0.4407	0.16989	2.5940[.014]
<b>Intercept</b>	1.0779	6.8302	0.15782[.876]
<b>Trend</b>	0.1269	0.020146	6.2992[.000]

Table 5 describes the results of ARDL estimated long run coefficients. This ARDL model is selected on the bases of SC Bayesian Criterion.

There is no cointegration found between the Agricultural land ( $\ln ALLA_t$ ), Water availability ( $\ln WA_t$ ), Loan provided by the Agriculture development bank ( $\ln LBA_t$ ) and the dependent variable the Agriculture output ( $\ln AO_t$ ). The intercept represents the coefficient of a dictatorship regime because this is a benchmark category. This coefficient is statistically insignificant to explain the dependent variable, the Agriculture output ( $\ln AO_t$ ) in the long run. As discussed earlier, the main imperfection of the entire political system of Pakistan is discontinued of economic policies. If we compare the political system of Pakistan with the political system of other countries we can easily find this difference,. Improved Seeds ( $\ln IMSE_t$ ) plays very important part to enhance the output of agriculture sector and this can be established through the connection between the dependent variable, the Agriculture output ( $\ln AO_t$ ) and Improved Seeds ( $\ln IMSE_t$ ). This association is positive and statistically significant at the 5% level. This demonstrates that the use of Improved Seeds ( $\ln IMSE_t$ ) increase by 1% is associated with an enhancement in the dependent variable, the Agriculture output ( $\ln AO_t$ ) by 0.55812%.

Fertilizer ( $\ln FER_t$ ) is also an essential input of agriculture. The Fertilizer ( $\ln FER_t$ ) has significant association with the Agriculture output ( $\ln AO_t$ ) at the 5% level. This demonstrates that a 1% enhancement in the first lag of Fertilizer ( $\ln FER_t$ ) is associated ith improvement in the dependent variable Agriculture output ( $\ln AO_t$ ) by 0.37875%.

As talked about in an earlier chapter, the intercept of this ARDL model presents the coefficient of a dictatorship regime because this is a benchmark category. This coefficient is statistically insignificant to explain the dependent variable the Agriculture output ( $\ln AO_t$ ).

Democratic regime also impacts the development and growth of the Agriculture output ( $\ln AO_t$ ) in the long run and this can be proved in the Table-6.26, by the association between the dependent variable Agriculture output ( $\ln AO_t$ ) and the dummy variable

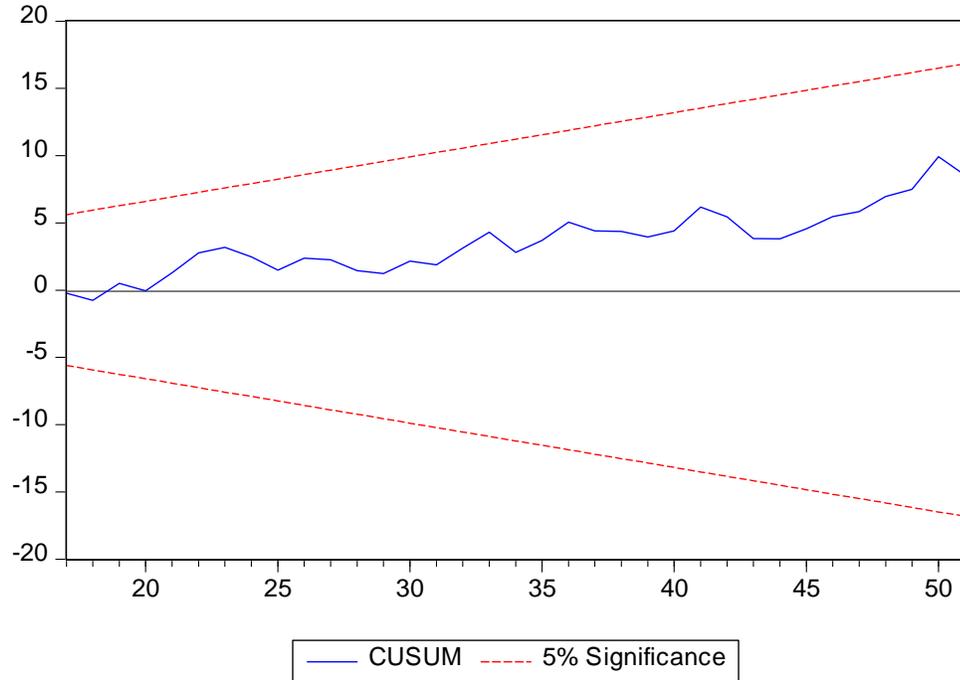
Democracy ( $DEM_t$ ). This association is positive and statistically significant at the 5% level. This demonstrates that if there is a Democratic regime the dependent variable Agriculture output ( $\ln AO_t$ ) grows by 1.5186%. We found a clear cut message from this result, if we want to develop the agriculture sector; we have to maintain the democratic system of this country.

**Table 6: Error Correction Representation for the Selected ARDL Model**

Dependent Variable = $\Delta \ln AO_t$			
Regressor	Coefficient	Standard Error	t-Stat [Prob]
$\Delta \ln ALLA_t$	0.90427	0.53188	1.7001[0.097]
$\Delta \ln WA_t$	0.12416	0.20803	.59682[0.554]
$\Delta \ln WA_{t-1}$	0.63466	0.1828	3.4719[0.001]
$\Delta \ln LBA_t$	0.00479	0.025895	.18497[0.854]
$\Delta \ln IMSE_t$	0.068098	0.049288	1.3817[0.175]
$\Delta \ln FER_t$	0.029635	0.069812	.42449[0.674]
$\Delta DEM_t$	0.061167	0.03525	1.7352[0.091]
<i>Trend</i>	0.036796	0.012223	3.0104[0.005]
$ECT_{t-1}$	-0.28995	0.095705	-3.0296[0.004]
$R^2$	0.60355	<i>Adjusted R<sup>2</sup></i>	0.45196
<i>DW-statistic</i>	2.0538	<i>F-Stat. F(13,34)</i>	5.7511[0.000]

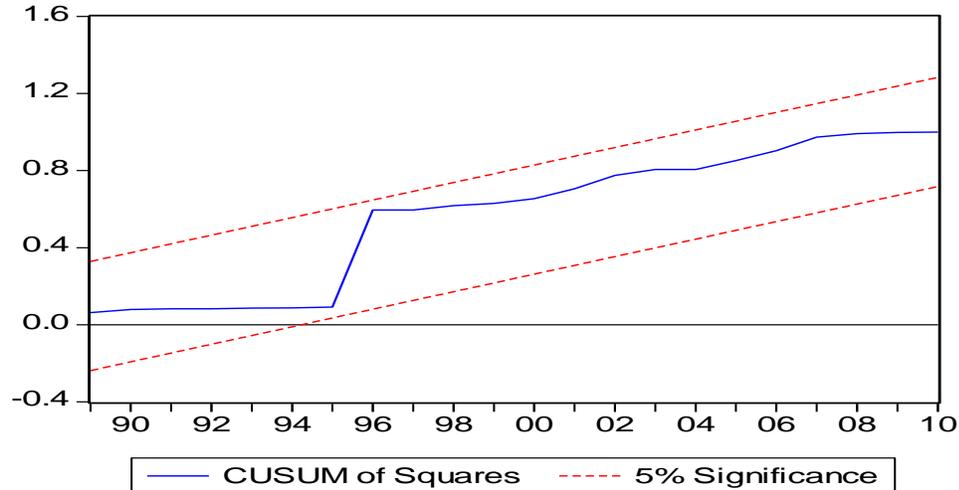
The above Table-6 describes the results of the short run dynamics afterward studying the long term effects of independent variables Agricultural land ( $\Delta \ln ALLA_t$ ), Water availability ( $\Delta \ln WA_t$ ), Loan provided by the Agriculture development bank ( $\Delta \ln LBA_t$ ), Improved Seeds ( $\Delta \ln IMSE_t$ ), Fertilizer ( $\Delta \ln FER_t$ ) and Dummy variable Democracy ( $\Delta DEM_t$ ) on the dependent variable the Agriculture output ( $\Delta \ln AO_t$ ). Table-6 shows the results of Error Correction Model (ECM) for the Selected ARDL Model. This ECM is selected on the bases of SC Criterion. As it can be observed from the table that the F-statistics of above regression are 5.7511 with p-value 0.000 and R-square ( $R^2$ ) is 60.355% and Adjusted R-square (Adjusted  $R^2$ ) is 45.196% as well as the Error Correction Term is negative and significant at the 1% level of significance.

The error correction term shows the speed of adjustment from short run to long run. The estimated coefficient value ( $ECT_{t-1}$ ) is 0.28995. It is statistically significant at the 1% level of significance. This coefficient of the error correction term depicts the equilibrium of the short run model. It tells us the speed at which the preceding disequilibrium of the model is being adjusted. The value of ( $ECT_{t-1}$ ) is 0.28995 it means that the model adjusts its preceding disequilibrium at the rate of 28.995% in one year.



**Figure-1: Plot of CUSUM**

The stability of long run and short run estimates has been tested by applying the cumulative sum (CUSUM) and the cumulative sum of squares (CUSUMsq). It is suggested by Pesaran and Shin, (1999) to apply these tests. The null hypothesis of both CUSUM and CUSUMsq may be accepted that if plots of both tests are moving between critical limits. The null hypothesis is “regressions equation is correctly specified” (Bahmani-Oskooee and Nasir, (2004). In fig. 6.1.1, the straight lines represent critical bounds at 5% significance level. The results of both CUSUM and CUSUMsq tested are reported in Figures 6.1.1 and 6.1.2. The plot of CUSUM test not crosses upper and lower critical limit.



**Figure 2: Plot of CUSUMsq**

The CUSUM and CUSUMsq tests show that graphs of both tests do not cross lower and upper critical limits. So, we can conclude that long and short runs estimates are reliable and efficient.

### 5. Conclusion and Policy Recommendation

The principal inferences of this study is different analyses have been summarized earlier in the different four different models. The main results are briefly discussed below. The objective of this study is to investigate the macroeconomic performance indicators and sectors in various regimes. The existing work contrasts from the previous research as in it investigates not just the growth distribution of agricultural sector, industrial sector, services sector and Gross Domestic Product pattern in various political administrations, additionally estimates these development and growth rates in Pakistan. How democracy as well as dictatorial approaches demonstrate their effect on these indicators and sectors.

The time series data is employed for the purpose of analysis span from 1960 to 2010 in this study. The stationary of the said data is checked through Augmented Dickey-Fuller (ADF) Test (Augmented Dickey-Fuller (ADF) test was developed by Dickey and Fuller in 1979) and Phillips Perron Test (Peter C. B. Phillips and Pierre Perron collectively build the Phillips Perron test). ARDL Bound Testing Approach for Cointegration developed by Pesaran and Shin (1998) and the Johansen Co-Integration Test are used to check the long run relation between dependent and independent variables of this study.

This study is an endeavor to estimate four models to check the impact of various political regimes and economic indicators on macroeconomic performance of Pakistan. In the first ARDL model dependent variable is Agriculture output ( $\ln AO_t$ ) and it can be observed from the table-4 that the F-statistics of regression are 3962.1 with p-value 0.000 and R-square ( $R^2$ ) is 0.99934 and Adjusted R-square (Adjusted  $R^2$ ) is 0.99909. There is no cointegration found between the Agricultural land ( $\ln ALLA_t$ ), Water availability

( $\ln WA_t$ ), Loan provided by the Agriculture development bank ( $\ln LBA_t$ ) and the dependent variable the Agriculture output ( $\ln AO_t$ ). The intercept represents the coefficient of a dictatorship regime because this is a benchmark category. This coefficient is statistically insignificant to explain the dependent variable the Agriculture output ( $\ln AO_t$ ) in the long run. Improved Seeds ( $\ln IMSE_t$ ) play very important to enhance the output of agriculture sector and this can be established through the connection between the dependent variable the Agriculture output ( $\ln AO_t$ ) and Improved Seeds ( $\ln IMSE_t$ ). This association is positive and statistically significant at the 5% level. Fertilizer ( $\ln FER_t$ ) is also an essential input of agriculture. The Fertilizer ( $\ln FER_t$ ) has significant association with the Agriculture output ( $\ln AO_t$ ) at the 5% level. Democratic regime also impacts the development and growth of the Agriculture output ( $\ln AO_t$ ) in the long run and this can be proved in the Table-5, by the association between the dependent variable Agriculture output ( $\ln AO_t$ ) and the dummy variable Democracy ( $DEM_t$ ). This association is positive and statistically significant at the 5% level. The results of the short run dynamics described in Table-6 in which independent variables Agricultural land ( $\Delta \ln ALLA_t$ ), Water availability ( $\Delta \ln WA_t$ ), Loan provided by the Agriculture development bank ( $\Delta \ln LBA_t$ ), Improved Seeds ( $\Delta \ln IMSE_t$ ), Fertilizer ( $\Delta \ln FER_t$ ) and Dummy variable Democracy ( $\Delta DEM_t$ ) on the dependent variable the Agriculture output ( $\Delta \ln AO_t$ ). Table-6 shows the results of Error Correction Model (ECM) for the Selected ARDL Model. This ECM is selected on the bases of SC Criterion. As it can be observed from the table that the F-statistics of above regression are 5.7511 with p-value 0.000 and R-square ( $R^2$ ) is 60.355% and Adjusted R-square (Adjusted  $R^2$ ) is 45.196%. The short run association is found between the dummy variable Democracy ( $\Delta DEM_t$ ) and the Agriculture output ( $\Delta \ln AO_t$ ) and it is positively associated with each other and it's also statistically significant at a level 10% as well as the Error Correction Term is negative and significant at the 1% level of significance.

If we consider all these facts and figure we cannot anticipate either dictatorship is useful or democratic system is feasible for Pakistan, only international shock, and extensive and lengthy government tenure which takes after steady strategies can contribute high economic performance, growth and development. Reynolds (1983), inspected the historic experience of numerous nations, generally inferred that boost in the economic performance, growth and development are commonly connected with major political changes. It implies that governmental issues do make a difference, however "regimes" don't catch the significant differences. Similar conclusion is valid for Pakistan, just Politics matter rather than the type of the "regimes". So Pakistan can accomplish high economic performance, growth and development through embracing steady and consistent strategies/policies.

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