

## **ANALYSIS OF THE IMPACT OF AGRO – INDUSTRIAL SECTORS ON PAKISTAN'S ECONOMIC GROWTH**

**Muhammad Urfan Tahir<sup>1</sup>, Prof. Dr. Abdul Ghafoor Awan<sup>2</sup>**

**ABSTRACT**-The objective of the study is to measure the Impact of Agro-Industrial sector on Pakistan's economic growth. This economy is consisting of traditional agriculture sector and modern manufacturing sector. Pakistan is considered as agriculture country because more than 60% of its population is directly involved with this profession. Times series dataset from 1972 to 2012 is used to analyze the impact of Agro-Industrial sector on Pakistan's economic growth. Gross domestic product (GDP) per capita is taken as dependent variable while the explanatory variables include; inflation rate, employment of labor force, gross capital formation per worker, trade openness, agriculture value added growth rate and manufacturing value added growth rate. Auto regressive distributed lag (ARDL) model is used as statistical technique to analyze the data. Our result shows that explanatory variables of agriculture and manufacturing sectors have significant impact on dependent variable (gross domestic product (GDP) per capita). In policy recommendations, government must take steps and provide necessary incentive to accelerate growth in both agriculture and manufacturing sectors for economic development of Pakistan.

**Key words:** Agro-Industrial Economy, ARDL, GDP per capita.

**Type of study:** Original Research Paper

Paper received: 20.02.2017

Paper accepted: 22.04.2017

Online published:01.07.2017.

---

1. M.Phil Scholar, Department of Economics, Institute of Southern Punjab-Multan-Pakistan. [muhhammadirfantahirrao@gmail.com](mailto:muhhammadirfantahirrao@gmail.com)

2. Dean, Faculty of Management, Social Sciences and Humanities, Institute of Southern Punjab, Multan-Pakistan. [ghafoor70@yahoo.com](mailto:ghafoor70@yahoo.com). Cell # +923136015051.

## 1. INTRODUCTION

Agro-Industrial economy is considered as the economy of the two sectors, one is agriculture sector, which is known as the traditional sector of the economy and the other one is the modern sector of the economy, which is known as the manufacturing sector of the economy. Many centuries ago human struggle was started with traditional sector to meet food need. Today the industrial sector is assumed as engine of economic growth because all technological advancements are being taken place in this sector. Other vibrant sectors are Banking and services sectors. The importance of the agriculture sector is still existing because it meets the food needs of human being.

Agriculture sector is the backbone of Pakistan economy. In earlier periods, the traditional sector was not modernized but today it is highly modern sector due to the application of technology and variety of seeds, fertilizers and pesticides. Due to these inventions the production of agriculture products like wheat, sugar, cotton, fish, meat, and variety of fruits have increased manifold and meeting the consumption requirement of billions of population living in different continents of the world. In underdeveloped countries agriculture sector is the major source of labour force employment. About 60 percent of Pakistan's labour force is engaged in agriculture sector and the share of this sector in GDP is around 25 percent. More than two-third population is living in rural areas of Pakistan and it is totally dependent on the production of agriculture crops. Although the share of Agriculture sector is declining over the years due to expansion of industrial and services sector, yet even then the role of agriculture sector is important in Pakistan's economy. Now this sector is also moving fast towards modernization and modern farming is developing in rural areas of Pakistan due to introduction of technology, variety of seeds, fertilizers and pesticides. According to latest research, poverty is a rural phenomenon and rural areas need attention of policy-makers to allocate required funds and take policy initiatives to eliminate poverty from rural areas of Pakistan. The rural population lacks sanitation, sewerage, telecommunication, transportation, quick market access and

non-farming employment opportunities because the focus of policy-makers is on the development of urban areas due to rapid migration of population from rural to urban areas. The empirical evidence also highlights the facts that higher growth in agriculture sector has substantially contributed in to poverty reduction in Asia during 1970s and 1980s decades.

### **1.1. Concept of Agro-Industrial economy**

Agro-Industrialism is an idea broadly discussed in context of traditional and modern system of production. The concept of Agro-Industrialism explains the traditional way of production in different sectors and modern innovative production system. In particular, the idea of Agro-Industrialism holds onto four key components which are briefly stated as under: -

1. Distinctive arrangements of conditions, of which some are "predominant" and others "substandard", can exist together in a given space. Cases of this component of Agro-Industrialism incorporate Lewis' urban and rural segment Agro-Industrialism, the conjunction of rich, very taught elites with mass of ignorant destitute Agro-Industrials; and the reliance thought of the concurrence of effective well off industrialized countries with frail, devastated laborer social orders in the world economy.

2. This combination is unending and not simply transitional. It is not because of a brief question, in which case time could take out the error amongst predominant and second rate components. At the end of the day, the universal concurrence of riches and neediness is not just a recorded as a question that will be amended in time. Albeit both the phases of growth hypothesis and the basic change models verifiably make such presumptions, the truths of developing worldwide imbalances appear to disprove it.

3. Not just do the degrees of prevalence or inadequacy fall flat over hint at any lessening, however, they even have a natural inclination to increment. For instance, the efficiency crevice between laborers in developed and their partners in many LDCs appears to augment with every passing year.

4. The interrelations between the superior and inferior elements are such that the existence of the superior elements does little or nothing to pull up the inferior element let alone “trickle down” to it. In fact, it may actually serve to push it down, “to develop its underdevelopment”; (Hans Singer 1970:60-61.).

5. Taking a gander at the hypothesis of Agro-Industrialism in monetary terms in connection with how improvement researchers have highlighted, it doesn't envelop all that we need to examine. In this way we concocted another definition in order to add to what the researchers examined before.

In our study, Agro-Industrialism is a perpetual condition of residential and worldwide relations. It communicates as focus and edges, weakness and agreeable versatility, prohibition and consideration, urban and provincial, formal and casual or significantly laborer and manager, youthful and old, male and female, worldwide and local law, and so forth we should examine all or part of the above issues underneath where we might chat on global and household Agro-Industrialism in partitioned.

## **1.2. Main Research Question**

The main research question of our study is “Does agro-industrial economy has impact on Pakistan's economic growth?”.

## **1.3. Objective of the Study**

The main objectives of this study were as under:

1. To find out the impact of agro-industrial economy on Pakistan's economic growth.
2. To measure the impact of individual sector empirically on Pakistan's economic growth.

## **2. LITERATURE REVIEW**

Gilbert et al. (2013) tried to investigate and explore the contribution of agriculture exports to economic development in Cameroon, case of cocoa, coffee and banana with the help of extended Cobb Douglas production model using a data 1975 to 2009. Real gross domestic product, variables of interest, total labor force, gross domestic fixed capital formation and control variables are used as economic variables. Data were taken from the food and agriculture Organization statistics and World Bank Development indicators. Ordinary least square, co integration and vector

---

error correction models are used to find out the empirical results of short run and long run behavior of variables. Results show the mixed effect on domestic growth due to the agriculture export variables. Significant and positive effect was found between banana export and economic development, while significant and positive association was found between coffee and economic development of Cameroon and finally the effect of cocoa was insignificant and negative on economic growth. In control variables capital was found as a significant positive effect on economic growth, similarly the inflation has significant and positive effect on real GDP in Cameroon. Dawson et al (2012) attempted to estimate the role of productivity in accelerating overall economic growth of a country with a diminishing supply of arable land, continual population growth and to expanding food supply with productivity growth, study further analyzed the different macro-economic variables impact on total factor productivity of agricultural in Pakistan for the period of 1971 to 2006. Economic variables were as follows total factor productivity index, primary school enrolment proxy for human development, road length proxy for infrastructural development; inflation rate proxy for macro-economic instability, credit disbursed to agriculture sector % of agriculture GDP proxy for credit resource in agriculture and the sum of agricultural exports and imports as a % of agricultural GDP proxy for openness of agricultural economy. Data were collected from the FAO statistics database, Pakistan economic survey and handbook of statistics on Pakistan. A co integration economic methodology was used to analyze the economic variables. Results shows that credit resource, infrastructure development and human capital have positively impact on TFP of agriculture. Macroeconomic stability impact was significantly negative while the openness of agricultural economy had significant positive impact on productivity growth. Real per capita impact on productivity growth was positive but insignificant. It was suggested that policies that facilitate the above variable will improve the TFP in agriculture.

Gergin et al (2002) attempted to explore productivity pattern and economic growth in aggregated the Kenyan agriculture for the period of 1964 to 1996. Agriculture output, intermediate inputs and value added were taken as index

---

construction products. Data were taken from the central bureau of statistics. Output, capital, labor and intermediate inputs are used to construct the mathematical derivation and model specification. Tornqvist index used to measure the total factor productivity growth of agriculture and WD statistics was used to measure the autocorrelation behavior of the index variables. Results shows that the labor was the least significant source for growth, while capital was the most prominent and important contributor to output growth. The mean value of the growth rate of intermediates inputs decreased. In output growth the contribution of productivity growth was increased 10% to 26%.

Iqbal and Ramzan (2013), tried to explore the manufacturing, agriculture and services impact on the gross domestic product growth of Pakistan. The objective of the study was to determine the effect of agriculture, manufacturing and services sector on economic growth in Pakistan. Gross domestic product annual growth rate was taken as dependent variable while agriculture growth rate, manufacturing sector growth rate and services sector growth rate were taken as explanatory variables. A time series data of 1980 to 2010 was taken for analysis of the variables. Johnson co integration statistical technique used to estimate the behavior of variables. It was found that farming sector is more critical than the other segments of the economy for Pakistan and horticulture sector, producing sector and administration industry are altogether influencing the Gross domestic product yearly development of Pakistan. It was recommended that is must be distinguished the bottlenecks in monetary development and measures ought to be taken to evacuate them.

Ajmair et al (2014), tries to explore the impact of industrial sector growth on the gross domestic production of Pakistan. The objective of the study was to explore the relationship between the components of industrial sector and economic growth of the economy of Pakistan for the period of 1950 to 2010. Growth of gross domestic product was taken as dependent variable, while growth of manufacturing, growth of industrial sector, growth of electricity, gas and water supply distribution, growth of construction were taken as explanatory variables. Data were taken from the Pakistan Bureau of Statistics, economic survey of Pakistan and State Bank of Pakistan.

---

Ordinary least square method was used to analyze the dataset. It was found that all the part of industrial sector shows a positive association with Gross domestic product aside from mining and quarrying area that demonstrates the negative relationship as well as gives an inconsequential outcome. Every other outcome was factually critical and reliable in straightforward direct relapse. It was recommended that small industry should be made light and dynamic accomplice being developed process. There is requirement for Pakistan modern part to concentrate on the production of new items, import substitutions, trade products and merchandise with developing interest.

Maqsood et al. (2012) estimated the volatility of agriculture sector in Pakistan and attempted to find volume of volatility, employment and production in agriculture sector related with the growth of economy. Main objective of the study was to measure the real cause volatility of agriculture and impact on economic growth of Pakistan. Agriculture employment, real agriculture production, agriculture volatility and real gross domestic product were taken economic variables. A time series data analysis was used for the period of 1972 to 2011. Data was taken from the economic survey of Pakistan and World Bank. Johson co integration, Eigen values tests, trace statistics and Auto Regressive Conditional Hetroscadesticity family models were applied to measure the economic behavior of variables. Results show that employment in agriculture sector and agriculture productivity are significantly and positively associated with growth of economy, while volatility of agriculture is negatively contributing in growth of the economy. It was suggested that widespread transparent program for rural development and agriculture sector should be taken by Government for sustained long term growth of economy.

Qasim et al, (1996) tried to find out agriculture growth performance of Pakistan from 1950 to 1995, estimated the long term growth rate of agriculture and fluctuations from year to year or decade to decade. Crop production, crop land, productivity of per acre, aggregate inputs are used in total factor productivity index. Data was taken from kemal (1992) and Government of Pakistan (1960 to 1996). Partial productivity index and production index are used to analyze and interpret the behavior of the input and output factors of agriculture in Pakistan. It was found that

---

during the period of early seventies and fifties the growth was not remarkable or these decades were lacked any growth. During the decade of sixties, the growth rate was marked highly in the country but the since 1979-80 the performance was not satisfactory and the average growth rate was exceeded from the population growth rate of the country. During the 1980s role of agriculture price policies was not positive on development and use of technology in agriculture. It was suggested that the pricing policies of agriculture product should be improved and investment in research and development in agriculture should be expand.

Olajide et al, (2011) tried to estimate the change and development in productivity of agriculture in Sub Sahara Africa countries in the background of different institutional arrangements through using a Data Employment Analysis. A time data of Agriculture production and mean of production information were from the 1961 to 2003. Total agriculture area, irrigation, rainfall while total rural population were taken as the input index variables while crop and livestock index used as output index. Data were taken from the Steve O'Connell data base, FAO and AGROSTAT. Data employment analysis and Malmquist index were used to measure the total factor productivity index. Results show that total factor productivity increases in Sub Sahara Africa agriculture due to the changes in technological manner rather than the changes in efficiency, which was the main constructed factor of higher TFP during the reference period. It was suggested that rural development activities cannot be really transformed in valuable action despite poverty alleviation funding of donor agencies should be through the rural development program.

Leaderman et al, (2004) attempted to measure the three main factors as firstly estimate the growth in agriculture total productivity using a translog production function for a panel of countries, secondly tried to find out the empirically determinants of agriculture productivity with controlling of infrastructure and some other public goods, while thirdly tried to focus on international heterogeneity on Latin America and Caribbean countries. Literacy rate, total population, irrigated land, domestic credit to private sector of GDP, paved roads, telephone lines and electricity generating capacity were taken as economic variables. Data were taken from the

World Bank and World Development indicators, Calderon and Serven (2003). Principal component regression and Ordinary least square regression were used as econometric techniques for analyzing behavior of variables. It was found that in most developing countries the growth rate of total factor productivity measured positively during the 1960- 2000 and was higher in developing countries such as Argentina, Brazil and Mexico. Electricity generating capacity was a positive determinant factor of total factor productivity, while surprisingly; roads impact was negatively on total factor productivity growth.

Awan (2012), (2013) and (2014) discussed in detail the impact of human capital, technology and productivity on economic growth and concluded that the developing countries should transform their economies from traditional to modern economies by promoting innovation and high tech industries.

### 3. RESEARCH METHODOLOGY

#### 3.1 Study Design

The objective of study is to analyze the Impact of Agro-Industrial economy Pakistan's economic growth for the period of 1972 to 2012. Gross domestic product per capita is taken as dependent variable and the explanatory variables are: inflation rate, employment labor force, gross capital formation per worker, trade openness, and agriculture value added growth rate and manufacturing value added growth rate. We used secondary data extracted from Economic Survey of Pakistan, IMF, World Bank and State Bank of Pakistan database. We took 1972-2012 as a sample period of study. We used different statistical techniques to analyze the data and draw the results. The list of selected variables is shown in Table 1.

Table 1: List of explanatory and explained variables in the study.

Variables	Description of variables	Measurement Unit
<i>Explained variable</i>		
GDPC	Real Gross domestic production per Capita	Annual growth (%)
<i>Explanatory variables</i>		
GCF	Gross capital formation	Annual growth (%)

INF	Inflation rate (CPI)	Annual growth (%)
TOP	Trade openness	Annual growth (%)
MGR	Manufacturing growth rate value added	
AGR	Agriculture value added growth rate	Annual growth (%)
ELF	Employed labor force	Annual growth (%)

### 3.2 Analytical Techniques

We used Autoregressive distributed lag (ARDL) model to determine relationship between selected variables. We also applied the Augmented dickey fuller (ADF) test to check whether all the selected variables are integrated at dissimilar order like 1(0) and 1(1), is the basic requirement to use the autoregressive distributed lag model. Otherwise if all selected variables are integrated at 1(0) order then a simple OLS method is used, while, if order of integration is at 1(1) Johansson co-integration test is used.

### 3.3 Specification of Model

To see the impact of agro-industrial sectors on economic growth, we engrave the following equation: -

$$GDPC = \beta_0 + \beta_1 GCF + \beta_2 INF + \beta_3 TOP + \beta_4 MGR + \beta_5 AGR + \beta_6 ELF + \varepsilon_i$$

Where  $\varepsilon_i$  is the distributed term  $\beta_0$  is the intercept term, while  $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$  are the slope coefficient of parameters.

While, the unrestricted vector error model in presented as.

$$\begin{aligned} \Delta(GDPC)_t = & \gamma_0 + \sum_{i=1}^a \gamma_1(GDPC)_{t-i} + \sum_{i=0}^b \gamma_2(GCF)_{t-i} + \sum_{i=0}^c \gamma_3(INF)_{t-i} \\ & + \sum_{i=0}^d \gamma_4(TOP)_{t-i} + \sum_{i=0}^e \gamma_5(MGR)_{t-i} + \sum_{i=0}^e \gamma_6(AGR)_{t-i} + \sum_{i=0}^e \gamma_7(ELF)_{t-i} \\ & + \gamma_8(GDPC)_{t-1} + \gamma_9(GCF)_{t-1} + \gamma_{10}(INF)_{t-1} + \gamma_{11}(TOP)_{t-1} + \gamma_{12}(MGR)_{t-1} + \gamma_{13}(AGR)_{t-1} + \\ & \gamma_{14}(ELF)_{t-1} \dots \end{aligned} \quad (1)$$

Equation 1 is the Auto regressive distributed lag model equation which presents the long run and short run relationship between explained and explanatory variable.  $\gamma_0$  is the intercept term and short run coefficient of the determinants are as follows

$\gamma_1, \gamma_2, \gamma_3, \gamma_4, \gamma_5, \gamma_6, \gamma_7$  and the long run coefficients in auto regressive distributed lag model of the variables are as follows  $\gamma_8, \gamma_9, \gamma_{10}, \gamma_{11}, \gamma_{12}, \gamma_{13}, \gamma_{14}$ , whereas,  $\varepsilon_t$  is the disturbance term.

### 3.3.1 Long Run Model

The long run relationship between explained and explanatory variable is shown in the following equation.

$$(GDPC)_t = \alpha_0 + \sum_{i=1}^{z1} \alpha_{1i}(GDPC)_{t-i} + \sum_{i=0}^{z2} \alpha_{2i}(GCF)_{t-i} + \sum_{i=0}^{z3} \alpha_{3i}(INF)_{t-i} + \sum_{i=0}^{z4} \alpha_{4i}(TOP)_{t-i} + \sum_{i=0}^{z5} \alpha_{5i}(MGR)_{t-i} + \sum_{i=0}^{z6} \alpha_{6i}(AGR)_{t-i} + \sum_{i=0}^{z6} \alpha_{7i}(ELF)_{t-i} + \varepsilon_t \dots \dots \dots .(2)$$

### 3.3.2 Short run Model

Error Correction Models (ECMs) are a class of different time arrangement models that directly assess the speed at which is an explained variable return back to balance after an adjustment in a free factor. ECMs are helpful for evaluating both long run and short run time impacts of one-time arrangement on another. ECMs give them a number of desirable properties.

- Estimation of long run period and short run effects
- Easy interpretation for the shorter and longer term effects
- Applications to both stationary and integrated time series data
- Can be measured with OLS
- Theoretical base of Model.

The short run relationship between dependent and independent variables is presented in the equation 3.. The ECM term lagged as (ECM)<sub>t-1</sub> is added in the equation to draw the results.

$$\Delta(GDPC)_t = \gamma_0 + \sum_{i=1}^{k1} \gamma_{1i}(GDPC)_{t-i} + \sum_{i=0}^{k2} \gamma_{2i}(GCF)_{t-i} + \sum_{i=0}^{k3} \gamma_{3i}(INF)_{t-i} + \sum_{i=0}^{k4} \gamma_{4i}(TOP)_{t-i} + \sum_{i=0}^{k5} \gamma_{5i}(MGR)_{t-i} + \sum_{i=0}^{k6} \gamma_{6i}(AGR)_{t-i} + \sum_{i=0}^{k6} \gamma_{7i}(ELF)_{t-i} + \lambda (ECM)_{t-1} + \varepsilon_t \dots \dots \dots .(3)$$

(ECM<sub>t-i</sub>) ECM shows short-run relationship between dependent and independent variables, as well as long run relationship between explained and explanatory variable and speed of their adjustment.

$$\Delta P_t = \gamma + \delta \Delta_{t-1} + \lambda (ECM_{t-1}) + \varepsilon_t \dots \dots \dots .(4)$$

ECM<sub>t-1</sub>, error correction Model is presented in equation 4, the symbol  $\delta$  shows the shorter period effect and  $\lambda$  shows the speed of adjustment. Disequilibrium rate is shown by the error term.

#### 4. DATA ANALYSIS

The results of our long-run and short-run models and regression analysis are shown in the following tables: -

##### 4.1 Long-Run Model

The results of long-run model are shown in Table 2 .

Table 2 Result of Long Run Model

Estimated Coefficients in Long Run			
ARDL (0,0,2,2,0,0) selected based on Schwarz Bayesian Criterion			
Dependent variable is GDPC			
38 observations used for estimation from 1972 to 2012			
Variables	Coefficient	Standard Error	T Ratio[Prob]
GCF	.011129	.044614	.24945[.805]
INF	-.18027	.065687	2.7444[.011]
AGR	.23586	.067059	3.5172[.002]
TOP	.14433	.083433	1.7299[.095]
MGR	.21345	.045354	2.9843[.031]
ELF	.10773	.041150	2.6181[.014]
C	1.6021	1.0498	1.5261[.139]
T	-.10722	.033234	3.2262[.003]

The Auto regressive distributed lag (ARDL) model has been used to estimate the impact of traditional and modern sectors on Pakistan's economic growth during 1972 to 2012. Explanatory and explained variables relationship in the long run period shown in Table 2. The value of the coefficient shows that one-unit increase in the GCF will cause 0.01- percent increase in the economic growth and it indicates statistically insignificant relationship. The value of coefficient indicates that one-unit increase in inflation rate will cause -0.18 percent decreases in the economic growth

and it shows the statistically significant relationship between variables. The coefficient value shows that one-unit increase in agriculture value added will accelerate .23 percent increase in the economic growth and it shows statistically significant relationship. The coefficient value shows that one-unit increase in manufacturing value added growth rate will in accelerate 21 percent increase in economic growth and it indicates the statistically significant relationship. Coefficient value shows that one-unit increase in the ELF will cause 10 percent increase in the economic growth and it shows the statistically significant relationship. Coefficient value shows the one-unit increase in the trade openness would cause 14 percent increase in the economic growth and it is statistically significant relationship between variables.

**4.2 Short-Run Model**

The results of short-run model is shown in Table 3.

Table 3 Short Run Model

Dependent variable is gdp			
38 observations used for estimation from 1972 to 2012			
Variable	Coefficient	Standard Error	Ratio[Prob]
dGCF	.011129	.044614	.24945[.805]
dINF	-.060404	.066935	.90243[.375]
dINF1	.16295	.056626	2.8777[.008]
dAGR	.23586	.067059	3.5172[.002]
dTOP	.014659	.052723	.27804[.783]
dTOP1	-.054739	.027147	2.0164[.053]
dMGR	.21345	.045354	2.9843[.031]
dELF	.10773	.041150	2.6181[.014]
dC	1.6021	1.0498	1.5261[.138]
dT	-.10722	.033234	3.2262[.003]
ecm(-1)	-0.78	0.56	-4.74 [.004]
ecm = GDPC -.10773*ELF + .18027*INF -.14433*TOP -.011129*GCF .23586			

$$*AGR = -1.6021 * C + .10722 * T$$

Short run behavior of the explained and explanatory variables is presented in table 3, which shows that trade openness, employed labor forces, agriculture productivity value added growth rate and manufacturing value added growth rate variables have significantly positive relationship with the economic growth of Pakistan, whereas, the gross capital formation and inflation rate have insignificant relationship with economic growth of Pakistan. Long run relationship shows that inflation rate is significant but in the short run it is statistically insignificant.

#### 4.3 Regression Analysis

The results of regression analysis are shown in Table 4

Table 4 Results of Regression Analysis

R-Squared 1	.76878	Adjusted R squared	.68314
S.E. of Regression	1.3456	F-stat. F( 9, 28)	9.9746[.000]
Akaike Info. Criterion	-69.7074	Schwarz Bayesian Criterion	78.7141
		DW-statistic	2.0203

In the regression analysis the value of  $R^2$  is 0.76878 which describes that independent variables have 76% impact on dependent variable. Similarly, the other 24% variations in the dependent variable is due to the residual term or error term. It means that our model is goodness of fit. The value F- Statistics or probability value is below the 5% (.000) which reveals the overall level of significance in the model. The DW-Statistics value is 2.0203 which are near about 2 so there is no autocorrelation in between variables.

#### 4.4 Stability test:

Cumulative sum control charts stability test in ARDL model is used to check the stability of the dataset. Selected variables and the dataset are stable because cumulative sum of recursive residuals level is within the range of 5%, which is the level of significance.

Table 5 Bound testing for co- integration

Variables	Calculated F-Statistics	Lower Bound (Critical Value)	Conclusion
GDPC / GCF, INF, AGR TOP, MGR, ELF	2.98 [0.099]	2.75 (90%)	Co-integration exist

Authors’ own calculation,

the F-statistics calculation value is 2.98 while the critical value is 2.75 at  $k = 6-1 = 5$  is cited from Pearson et al (2001) shows that co-integration exists among variables.

Table 6 shows the results of ADF test.

#### 4.5 Augmented Dicky Fuller Test

The results of Augmented Dicky Fuller (ADF) are shown in table 6.

Table 6. Augmented Dickey Fuller Test

Variables	At level		At 1 <sup>st</sup> difference		
	Intercept	Intr. & trend	Intercept	Intr& trend	Integration
GDPC	-5.564	-	-	-	I(0)
GCF	-6.09*	-	-	-	I(0)
INF	-3.23	-3.313	- 7.583*	-	I(1)
AGR	-7.925	-	-	-	I(0)
TOP	-14.15*	-	-	-	I(0)
MGR	-3.8107	-	-	-	I(0)
ELF	0.922	-0.577	-5.98*	-	I(1)

Source: Author’s calculations.

Augmented dickey fuller (ADF) test shows that variables such as trade openness, gross domestic production per capita, gross capital formation, value added of manufacturing sector growth rate and agriculture value added growth rate are integrated at I(0) level, while the inflation rate and employment labor force are

---

integrated at 1<sup>st</sup> order of integration. So the results of above table show that variables are integrated at different order.

## **5. CONCLUSIONS**

The objective of this paper was to measure the impact of Agro-Industrial economy on economic Pakistan's economic growth during the period of 1972 to 2012. Agro-Industrial economy is the combination of traditional agriculture sector and modern industrial sector. Today agriculture sector is also growing and number of innovations are being introduced in this sector. Pakistan is specifically agriculture country because its 60% population is directly involved with agricultural activities. Agriculture sector is backbone of Pakistan economy because economic growth is dependent upon it. But it is not growing according to need and desired of the country and level of crops yield is very low.

In our model we measure the Agro-Industrial economy through combine effect of explanatory variables of agriculture and industrial sectors on explained (dependent) variable- the gross domestic product per capita. Explanatory variables of the model were inflation rate, employment labor force, gross capital formation per worker, trade openness, agriculture value added growth rate and manufacturing value added growth rate. All explanatory variables have significant relations with explained variable except inflation rate gross capital formation. Our results highlight the fact that the objective of fast economic growth cannot be achieved without proper growth of agriculture sector due its heavy weight in Pakistan's GDP. The Government of Pakistan should pay equal attention of the development of both industrial and agriculture sectors and in that way the overall economic development and poverty alleviation can be achieved.

## **6. POLICY RECOMMENDATIONS**

On the basis of our conclusions we would like to make the following recommendations: -

1. Agriculture sector is the backbone of Pakistan economy and as such Government of Pakistan should take steps to improve its productivity through financial incentives and introduction of technology.

---

2. Similarly, proactive policy framework should be frame to make industrial sector of the economy competitive.

3. Coordination between agriculture and industrial sectors should be created by involving all stakeholders in policy-decisions process.

## **REFERENCES**

- Alesina, A. and Rodrik, D. (1994). Distributive politics and economic growth. *The Quarterly Journal of Economics*, 109 (2), 465–490.
- Azariadis, C. (1996). The economics of poverty traps part one: Complete markets. *Journal of Economic Growth*, I, 449–486.
- Awan, Abdul Ghafoor (2015). Shifting Global Economic Paradigm. *Asian Business Review*, Vol.4(3):35-40.
- Awan, Abdul Ghafoor (2014). The Enigma of US Productivity Slowdown: A Theoretical Analysis. *American Journal of Trade and Policy* Vol.1 (1):7-15.
- Awan, Abdul Ghafoor (2013). Relationship between Environment and Sustainable Economic Development: A Theoretical approach to Environmental Problems. *International Journal of Asian Social Sciences*, Vol.3 (3):741-761
- Awan, Abdul Ghafoor (2012). Diverging Trends of Human Capital in BRIC countries. *International Journal of Asian Social Science*, Vol.2(12): 2195-2219
- Banerjee, A. V. and Newman, A. F. (1993). Occupational choice and the process of development. *The Journal of Political Economy*, 101 (2), 274–298.
- Baumol, W. J. (1967). Macroeconomics of unbalanced growth: The anatomy of urban crisis. *The American Economic Review*, 57 (3), 415–426.
- Benabou, R. (1996a). Equity and efficiency in human capital investment: The local connection. *Review of Economic Studies*, 63 (2), 237–264.
- Bencivenga, V. R. and Smith, B. D. (1997). Unemployment, migration, and growth. *The Journal of Political Economy*, 105 (3), 582–608.
- Bourguignon, F. (1990). Growth and inequality in the dual model of development:

- The role of demand factors. *Review of Economic Studies*, 57 (2), 215–228.
- Durlauf, S. N. (1996). A theory of persistent income inequality. *Journal of Economic Growth*, 1, 75–93.
- Government of Pakistan, Agriculture Census (Various issues). Islamabad: Agriculture Census Organization, Statistics Division, *Federal Bureau of Statistics*.
- Government of Pakistan (1999), 50 Years of Pakistan in Statistics, Volume IIV. Islamabad: *Federal Bureau of Statistics*.
- Government of Pakistan (2007). Agricultural Statistics of Pakistan: 2006-2007. *Ministry of Food Agriculture and Livestock*, Islamabad.
- Government of Pakistan, Labour Force Survey (Various issues). Islamabad: Statistics Division, *Federal Bureau of Statistics*
- Gerdin, A, “Productivity and economic growth in Kenyan agriculture, 1964-1996, *Agricultural Economics*, 27 (2002) 7-13
- Gemmell, N., Lloyd, T., Mathew, M., 2000. “Agricultural growth and inter-sectoral linkages in developing economy.” *J. Agric. Econ.* 51(3): 353-370.
- Gollin, D., Parente, S.L., Rogerson, R., 2002. “The role of agriculture in development.” *American Economic Review* 92(2): 160-164.
- Zeira, J. (1993). Income distribution and macroeconomics. *Review of Economic Studies*, 60 (1), 35–52.
- Glomm, G. and Ravikumar, B. (1992). Public versus private investment in human capital: Endogenous growth and income inequality. *The Journal of Political Economy*, 100 (4), 818– 834.
- Harris, J. R. and Todaro, M. P. (1970). Migration, unemployment and development: a two-sector analysis. *The American Economic Review*, 60 (1), 126–142.
- Kongsamut, P., Rebelo, S. and Xie, D. (2001). Beyond balanced growth. *Review of Economic Studies*, 68 (4), 869–882.
- Kuznets, S. (1955). Economic growth and income inequality. *The American Economic Review*, 45 (1), 1–28.
- Lewis, A. W. (1954). Economic development with unlimited supplies of labour. *The*

*Manchester School*, 22 (2), 139–191.

Lucas, R. E. J. (2004). Life earnings and rural-urban migration. *The Journal of Political Economy*, 112 (1, part 2), S29–S59.

Masson, P. R. (2001). Migration, human capital, and poverty in a dual-economy of a developing country, *IMF Working Paper* No. 01/128.

Mesnard, A. (2001). Migration temporaire et mobilite intergenerational. *Louvain Economic Review*, 67 (1), 59–88.

Morrisson, C. (1998). Inequality and development: the role of dualism. *Journal of Development Economics*, 57, 233–257.

Ranis, G. (2006). Is dualism worth revisiting? In A. de Janvry and R. Kanbur (eds.), *Poverty, Inequality and Development: Essay in Honour of Erik Thorbecke, Economic Studies in Inequality, Social Exclusion and Well-Being*, vol. 1, 18, Berlin: Springer, pp. 371–385.

Rauch, J. E. (1993). Economic development, urban underemployment, and income inequality. *The Canadian Journal of Economics/Revue canadienne d'Economie*, 26 (4), 901–918.

Ravallion, M. (2002). On the urbanization of poverty. *Journal of Development Economics*, 68, 435–442.

Stiglitz, J. E. (1969). Distribution of income and wealth among individuals. *Econometrica*, 37 (3), 382–397.

Temple, J. R. W. (2005a). Dual economy models: a primer for growth economists. *The Manchester School*, 73 (4), 435–478.

Yuki, K. (2007). Urbanization, informal sector, and development. *Journal of Development Economics*, 84, 76–103.