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THE IMPACT OF SECTORAL INVESTMENT ON THE OUTPUT OF DIFFERENT SECTORS OF PAKSITAN'S ECONOMY

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ABSTRACT- The objective of the study is to examine the role of sectoral investment (investment in agriculture, transportation, construction & mining) on sectoral output (agriculture, industrial and services sectors output) of Pakistan. Time series data for the period 1972 to 2016 was used to examine the impact of sectoral investment on the output of these three sectors. The data was collected from databases of State bank of Pakistan, World Development Indicator, Pakistan economic survey and fifty years of statistics of Pakistan Economy. We used Solow growth model as theoretical base to measure the impact of labour and capital on sectoral output. Auto Regressive and Distributed Lag (ARDL) model and ADF and bound tests are utilized to check stationarity and long run relationship between variables. Our results show that labour and capital investment have positive and significant effect on agriculture, industrial and services sectors of Pakistan in the long run.

Key words: sectoral investment, labour force, sectoral output, Solow growth Model, ARDL Model.

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1. INTRODUCTION

1.1. Background of study

At the end of the 20th century, the entire amount of domestic investment in developing countries of the world started recovering again after inflation and deficit crises. This type of rescue regarding trend of investment, changed from public investment to private investment in various spheres of the economic sectors. Those countries had retort that different changes and challenges in several ways, which rise consequences of many sectors too by bringing revolutionary changes in world business trend because particular elements were the major reasons of very this transformation. (Bayraktar, 2003). In developing countries, by using innovative teachnology, seed and fertilizers enhance production in agriculture, which improved not only overall economic growth but also became a source to alleviate povertt (Zepeda, 2001). As for as; economic policies economic progress is based on the better economic performance and increasing growth of various sectors. In competitive economy interaction of different sectors are main sources for the balanced economic growth.

The Economic progress and prosperity of Pakistan is increasing day by day. The main source of economic development is based on the agricultural sector largely but many industrial and service sectors are also becoming a vital source of economic development Pakistan. Investment in different sectors is playing valuable contribution increasing agricultural, industrial and human resource development of the Pakistan. Trend of investing money in agricultural and industrial, transportation and construction, mining and tourism sectors could be beneficial in many ways. In this era of fast growing development of science and technology, medical and IT there is stiff

competition among countries. Every country is making best possible efforts to achieve the highest level of economic growth.

1.2 Research Problem

The main research problem of this study is to measure: The impact of sectoral investment on the output of different sectors of Pakistan."

1.2 Objectives of study

The objectives of study are stated in the following: -

1. To study the existing state of sectoral investment in Pakistan.
2. To determine relationship between sectoral investment and output of different sectors of Pakistan's economy.
3. To analyze how change in sectoral investment bring change sectoral output in Pakistan.

1.3. Scope of study

This study is very important because in Pakistan sectoral investment strategies were changed in different sectors and no balanced investment strategy was followed. The end result is that in one period one sector grew due to heavy period while in next it declined due to withdrawal of investment. So the results of this study will help policy makers to following a balanced sectoral investment to achieved balanced growth in all sectors and one sector should not be solely focused while other sector be ignored. This strategy is harmful in the long run and makes it impossible to attain sustainable economic development.

2. LITERATURE REVIEW

Aschauer (1989) differentiated between the public investments and argued that this different was as significant for economic progress and prosperity over the period 1949-1985. He found an association on the basis of

statistical data between gross domestic product and public investment, labor, growth in production and capital. It was concluded that public capital was the valuable component in the recipe for economic development and improving standard of livings.

Chandra and Thompson (2000) examined the connection between infrastructure spending and standard of living of the people over the period 1969 to 1993. At country's level, it was revealed by the study that highways had differentiated impact across those industries which increase their productions and reducing transportations costs. The study concluded that infrastructure is affected by the spatial allocations of economic activities.

Canning and Pedroni (2004) investigated the long run effects of infrastructures development on economic development. The time series data; from 1950 to 1992 has been used in this study. The research concluded that different projects of infrastructure variables like Electricity generation, smooth, paved and vast roads and telephones have positive impact on GDP.

Karim et al. (2005) prepared simple growth model of private and public sector investments and its impact on GDP growth. With the help of his study was based on secondary data over the period of 1980-81 to 2000-2001 at constant prices. The important variables used in the research are private investment, public investment, total investment, import, export and GDP. The study used OLS technique and concluded that all the variables were positively related with GDP. The research concluded that the private investments played much larger role in the growths process.

Pereira and Andraz (2006) examined the effects of public investments in transportation infrastructures, employment and output in Portugal over the

period of 1976 to 1998. The researcher adopted a vector auto regressive approach to analyze the effects of public investments. The empirical results showed that public investments had positive effects on output of 13 out of the 18 industries. Indeed, the elasticities of private investment with respect to public investment had positive impact on 16 out of 18 industries and in the private employment 13 of 18 industries had positive impact.

Kandenge (2010) explained the effects of the private and public's investment on economic development. The annual data was utilized in the study about the Namibia's macroeconomics variables for the periods 1970 to 2005 and it was followed co-integration approaches to make effective use of short and long run analysis. This study concluded that in addition to public and private investments, economic freedoms, labor and human capitals, imports and exports had significant and positive impact on the both; short and long-term economic development. On the contrary, the term of trade and real exchange rates were found to have negative effects on short and long-term economics.

Shoo et al. (2010) studied the impact of infrastructure developments on outputs development of China. In this study time-series data for 1975 to 2007 has been used. Important variables like GDP and domestic private investment, domestic public investment and total labor force, infrastructures index and per capita real public expenditures; health and education. In this study ARDL technique was used. The study found positive effect of domestic private investment, domestic public investment, total labor force, infrastructures index and per capita real public expenditures, health and education on gross domestic products.

3. RESEARCH METHODOLOGY

3.1 Type of data and sources

This is a quantities study in which we have used time series data for the period 1972 to 2016. This data was collected from different sources like Hand book of statistics on Pakistan by State Bank of Pakistan, World Development Indicator by World Bank, Pakistan Economic Survey 2016; issued by Federal Bureau of Statistics, Government of Pakistan and fifty years of statistics on Pakistan Economy. In this study, log-log forms of the models have also been utilized to observe elasticities among variables with respect to other variables for comparison. All these variables were taken in Pakistani Rupees excluding labor force. The sample of this study was consisting upon time series data of Pakistan over the period from 1972 to 2016.

3.2 Model specification

The present analysis is intended to observe the influence of sectoral investment on agriculture sectors output, industrial sectors output and services sectors outputs. That's why output has been taken as dependent variable. We followed Solow growth model. Two most important variables capital and labor have also been used in this study which show Solow growth model. Solow model is given as follows;

Output = f (sectoral investment, total labor force)

There are three sectors considered in output model like the model of the agricultural sector, the model of the services and the model of the industrial sector.

3.2.1 Model of Agricultural Sector

The functional of the model of Model of the agricultural sector is as follows:-

Output of agricultural sector = f (sectoral investment, total labor force)

Model of the agricultural sector may be written in equation form.

$$ragri = \alpha_0 \ lab\ agri^{\alpha_1}\ manu^{\alpha_2}\ serv^{\alpha_3}\ cons^{\alpha_4}\ mining^{\alpha_5}\ e^{\alpha_6}$$

To have elasticities, we considered Cob - Douglas form of above model to examine the impact of sector investment pertaining to agricultural sector output.

$$lragri = \alpha_0 + \alpha_1 llab + \alpha_2 lagri + \alpha_3 lmanu + \alpha_4 lserv + \alpha_5 lcons + a_6 mining + \mu_1$$

$\alpha_0, \beta_0, \gamma_0$ are intercepts, $\alpha'_s, \beta'_s, \gamma'_s$ are elasticity's of sectoral output with respect to each independent variable and $\mu_{1t}, \mu_{2t}, \mu_{3t}$ are error terms.

3.2.2. Industrial Sector Model

Model of the industrial sector may be written in functional form;

Output of industrial sector = f (sectoral investment, total labor force)

Model of the industrial sector may be written in equation form;

$$rind = \gamma_0 \ lab\ agri^{\gamma_1}\ manu^{\gamma_2}\ serv^{\gamma_3}\ cons^{\gamma_4}\ mining^{\gamma_5}\ e^{\gamma_6}$$

For having elasticities, we have considered Cob-Douglas form of above model to examine the impact of sector investment on the output of industrial sector.

$$lrind = \gamma_0 + \gamma_1 llab + \gamma_2 lagri + \gamma_3 lmanu + \gamma_4 lserv + \gamma_5 lcons + \gamma_6 mining + \mu_3$$

$\alpha_0, \beta_0, \gamma_0$ are intercepts, $\alpha'_s, \beta'_s, \gamma'_s$ are elasticity's of sectoral output with respect to each independent variable and $\mu_{1t}, \mu_{2t}, \mu_{3t}$ are error terms.

3.2.3 Service Sector Model

Model of the ervices sector may be written in functional form;

Output of the services sector = f (sectoral investment, total labor force)

Model of the services sector may be written in equation form;

$$rserv = \beta_0 \ lab\ agri^{\beta_1} manu^{\beta_2}\ serv^{\beta_3}\ cons^{\beta_4}\ mining^{\beta_5}\ e^{\beta_6}$$

For having elasticities, the study considers Cob-Douglas form of above model to examine the impact of investment on output of services sector.

$$lrserv = \beta_0 + \alpha_1 llab + \beta_2 agri + \beta_3 ltmanu + \beta_4 lserv + \beta_5 lcons + \beta_6 mining + \mu_2$$

In the above mentioned equation, dependent variables ragri is agriculture sector output, rserv is output of the services sector and rind is the output of the industrial sector. Independent variables like total labor force in Pakistan is taken as proxy of labor and the sectoral investments are the investment in agriculture sector (agri), investment in services (serv) sector, investment in manufacturing (manu) sector, investment in construction (cons) sector and investment in mining (mining) sector.

$\alpha_0, \beta_0, \gamma_0$ are intercepts, $\alpha'_s, \beta'_s, \gamma'_s$ are elasticity's of sectoral output with respect to each independent variable and $\mu_{1t}, \mu_{2t}, \mu_{3t}$ are error terms.

3.3. Analytical Techniques

3.3.1 Unit Root Test

In this research Augmented Dickey Fuller (ADF) test is used to check the stationarity of variables. The equations of Augmented Dickey Fuller (ADF) test is as following;

(1) Without Drift and Trend:

$$\Delta Y_t = \delta Y_{t-1} + \alpha_i \sum_{i=1}^{m} \Delta Y_{t-1} + u_t$$

(2) With Drift and no Trend:

$$\Delta Y_t = \beta_1 + \delta Y_{t-1} + \alpha_i \sum_{i=1}^{m} \Delta Y_{t-1} + u_t$$

(3) With Drift and Trend:

$$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \alpha_i \sum_{i=1}^{m} \Delta Y_{t-1} + u_t$$

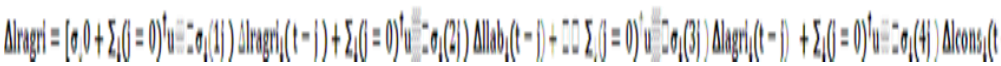
3.3.2 ARDL Bound Test Approach for Long Run Relationships

If bound test is applied to establish the long run relationship between the variable then it is necessary before undertaking the establishment of the ARDL model and this type of relationship may be found by mentioned below unrestricted error correction representation of the ARDL model.

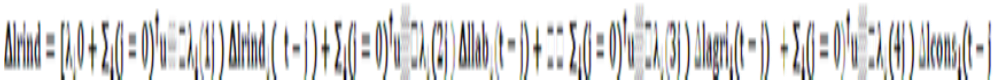
3.3.1.Model of the Services Sector

$$\delta_0 + \sum_{j=0}^{u} \delta_{1j}\,\Delta lrserv_{t-j} + \sum_{j=0}^{u} \delta_{2j}\,\Delta llab_{t-j} + \sum_{j=0}^{u} \delta_{3j}\,\Delta lagri_{t-j} + \sum_{j=0}^{u} \delta_{4j}\,\Delta lcons_{t-j} + \sum_{j=0}^{u} \delta_{5j}\,\Delta lmanu_{t-j} + \sum_{j=0}^{u} \delta_{6j}\,\Delta lserv_{t-j} + \sum_{j=0}^{u} \delta_{7j}\,\Delta lminig_{t-j} +$$

3.3.2. Model of the Agricultural Sector



3.3.3 Model of the Industrial Sector



The Wald test (F-statistics) is useful to find out the existence of long run relationship between the variables. The null and alternative hypothesis of no Co-integration for the model of the services sector.

$$[H_0: a_0 = a_1 = a_2 = a_3 = a_4 = a_5 = a_6 = a_7 = 0]$$

$$[H_1: a_0 \neq a_1 \neq a_2 \neq a_3 \neq a_4 \neq a_5 \neq a_6 \neq a_7 \neq 0]$$

This can easily be denoted by (lrserv | llab, lserv, lagri, lcons, lmining, lmanu). For agricultural sector null and on the other hand alternative hypothesis is

$$[H_0: b_0 = b_1 = b_2 = b_3 = b_4 = b_5 = b_6 = b_7 = 0]$$

$$[H_1: b_0 \neq b_1 \neq b_2 \neq b_3 \neq b_4 \neq b_5 \neq b_6 \neq b_7 \neq 0]$$

This can easily be denoted by (lragri | llab, lserv, lagri, lcons, lmining, lmanu). For industrial sector null hypothesis is

$$[H_0: c_0 = c_1 = c_2 = c_3 = c_4 = c_5 = c_6 = c_7 = 0]$$

$$[H_1: c_0 \neq c_1 \neq c_2 \neq c_3 \neq c_4 \neq c_5 \neq c_6 \neq c_7 \neq 0]$$

This can be conveniently denoted by (lrind | llab, lserv, lagri, lcons, lmining, lmanu)

This hypothesis conducted by the means of the F-statistics. For conclusion long run relationship the calculated value of F – statistics in the model is compared with two critical values tabulated by Pesaran et al. (2001). According to them, the lower critical value of the bond test presumed that the independent variable in the model are co-integrated of order zero 1(0) and upper critical value of the bond test assumed that independent variable in the model are co-integrated at level one 1(1). Then null hypothesis of co-integration cannot be rejected whenever the computed F-statistics is less than the lower bond critical value. That's why if the computed F-statistics is greater than the upper bond critical value, then null hypothesis will be rejected, and alternatives hypothesis will be accepted means long run relationship existence among the various variables in the model. Long run association between the variables can become inclusive if the value of F-statistics lies between lower and upper bond value.

3.4 Significance of Output in the Long Run

At this particular point, at first long run relationship is discovered. For long run appraisal Akaike information criterion (AIK) and Schwarz Bayesian criterion (SBC) are utilized to chose the lag length of the model therefore maximum lag length has been considered as 2 lags.

3.4.1 1 Long Run Service Sector model

$$d_0 + \sum_{j=0}^{u} d_1\, \Delta lrserv_{t-j} + \sum_{j=0}^{u} d_2\, \Delta llab_{t-j} + \sum_{j=0}^{u} d_3\, \Delta lagri_{t-j} + \sum_{j=0}^{u} d_4\, \Delta lcons_{t-j} + \sum_{j=0}^{u} d_5\, \Delta lmanu_{t-j} + \sum_{j=0}^{u} d_6\, \Delta lserv_{t-j} + \sum_{j=0}^{u} d_7\, \Delta lminig_{t-j} +$$

3.4.2. Model of the Long Run Agricultural Sector

$$e_0 + \sum_{j=0}^{u} e_1\, \Delta lragri_{t-j} + \sum_{j=0}^{u} e_2\, \Delta llab_{t-j} + \sum_{j=0}^{u} e_3\, \Delta lagri_{t-j} + \sum_{j=0}^{u} e_4\, \Delta lcons_{t-j} + \sum_{j=0}^{u} e_5\, \Delta lmanu_{t-j} + \sum_{j=0}^{u} e_6\, \Delta lserv_{t-j} + \sum_{j=0}^{u} e_7\, \Delta lminig_{t-j} + v_{2_t})$$

3.4.3 Model of the Long Run Industrial Sector

$$\Delta lrind = [f_0 + \sum_{j=0}^{u} f_1\, \Delta lrind_{t-j} + \sum_{j=0}^{u} f_2\, \Delta llab_{t-j} + \sum_{j=0}^{u} f_3\, \Delta lagri_{t-j} + \sum_{j=0}^{u} f_4\, \Delta lcons_{t-j} +$$

D's, e' s , f ' s are long run elasticities of above noted equations.

3.5. Sectoral Output in the Short Run

Error correction model are construct to examined short run coefficients.

3.5.1 Model of the Short Run Services Sector

$$g_0 + \sum_{j=0}^{u} g_1\, \Delta lrserv_{t-j} + \sum_{j=0}^{u} g_2\, \Delta llab_{t-j} + \sum_{j=0}^{u} g_3\, \Delta lagri_{t-j} + \sum_{j=0}^{u} g_4\, \Delta lcons_{t-j} + \sum_{j=0}^{u} g_5\, \Delta lmanu_{t-j} + \sum_{j=0}^{u} g_6\, \Delta lserv_{t-j} + \sum_{j=0}^{u} g_7\, \Delta lminig_{t-j} + \varepsilon$$

3.5.2 Model of the Short Run Industrial Sector

$$\Delta lrind = \left[k_0 + \sum_{j=0}^{u} k_1\, \Delta lrind_{t-j} + \sum_{j=0}^{u} k_2\, \Delta llab_{t-j} + \sum_{j=0}^{u} k_3\, \Delta lagri_{t-j} + \sum_{j=0}^{u} k_4\, \Delta lcons_{t-j} + \sum_{j=0}^{u} k_5\, \Delta lmanu_{t-j} + \sum_{j=0}^{u} k_6\, \Delta lserv_{t-j} + \sum_{j=0}^{u} k_7\, \Delta lminig_{t-j} + \varepsilon_{3_t}\right]$$

In the short run equation Δ is the first difference operator g, h or kare the short run elasticities. ψ is the speed of adjustment. It negative sign shows economy converge towards long run dynamics but positive sign shows economy diverge.

4.DATA ANALYSIS

4.1 UNIT ROOT TEST

The results of unit Root Test are shown in Table 1.

Table 1: Results of Unit Root Test

Variables	Test for unit root in	Include in test equation	Test statistics	Prob. value	Result
Investment in Agriculture	Level	Intercept	-0.39	0.9	1(1)
		Intercept & Trend	-2.46	0.3	
	1st Difference	Intercept	-6.56	0.00	
Investment in Services	Level	Intercept	-0.26	0.92	1(1)
		Intercept & Trend	-2.13	0.51	
	first Difference	Intercept	-6.64	0.00	
Investment in Construction	Level	Intercept	-0.54	0.87	1(1)
		Intercept & Trend	-3.11	0.11	
	first Difference	Intercept	-6.94	0.00	
Investment in Mining	Level	Intercept	-1.46	0.53	1(0)
		Intercept &Trend	-3.62	0.03	
Services sector Output	Level	Intercept	-1.81	0.36	1(0)
		Intercept & Trend	-4.14	0.01	
Industrial sector Output	Level	Intercept	-1.59	0.47	1(0)
		Intercept & Trend	-6.37	0.00	
Labor force	Level	Intercept	0.23	0.94	1(0)
		Intercept & Trend	-4.18	0.01	
	Level	Intercept	-0.98	0.75	1(0)

Investment in Manufacturing		Intercept & Trend	-4.25	0.00	
Agriculture sector Output	Level	Intercept	-0.44	0.89	1(1)
		Intercept & Trend	-2.60	0.27	
	1st Difference	Intercept	-8.07	0.00	

The results of unit root test have been shown in the table. each variable has been checked for order of integration at level by the inclusion of the intercept first, therefore, by inclusion of the intercept and trend at level secondly, and then it has been carried on. Similarly, investment in agricultural sector is checked at level by inclusion of the intercept, the valuable reports describe that this variable is not stagnant at level by inclusion of the intercept. That's why this variable is checked at level by combining intercept and trend, the value of probability describes that this particular variable is not stagnant at level. Investment in agricultural sector is checked at first difference by inclusion of the intercept, the value of probability reports that this particular variable is stagnant at first difference by inclusion of the intercept.

Investment in services sector is checked at level by the inclusion of the intercept, the value reports that this particular variable is not stationary at level by including intercept, and then this variable is checked at level by combining intercept and trend, the value of probability highlights that this variable is not stationary at level. Similarly, investment in the services sector is checked at first difference by including intercept, the worth of probability reports that this variable is stationary at first difference by inclusion of the intercept.

Investment in the sector of the construction is checked at level by inclusion of the intercept, the value reports that this variable is not stagnant at level by including intercept, and then this variable is checked at level by combining

intercept and trend, the value of probability indicates that this particular variable is not stationary at level. Investment in the sector of the construction is checked at first difference by inclusion of the intercept, the value of probability reports that this variable is stagnant at first difference by including intercept.

Investment in the sector of the mining is checked at level by including intercept, the value reports highlights that this variable is not stationary at level by inclusion of the intercept, and then this particular variable is checked at level by inclusion of the intercept and trend, the value of probability shows that this variable is stagnant at level. In the sector of services output is checked at level by including intercept, the value reports described that this variable is not stagnant at level by including intercept, and then this particular variable is checked at level by inclusion of the intercept and trend, the value of probability indicates that this particular variable is stationary at level.

Industrial sector output is checked at level by including intercept, the value reports that this variable is not stationary at level by including intercept, then this variable is checked at level by including intercept and trend, the value of probability shows that this variable is stationary at level. Labor Force is checked at level by inclusion of the intercept, the value reports that this variable is not stationary at level by including intercept, and then this variable is checked at level by including intercept and trend, the value of probability shows that this variable is stationary at level.

Investment in the sector of manufacturing is checked at level by inclusion of the intercept, the value reports that this variable is not stagnant at level by including intercept, and then this variable is checked at level by

combining intercept and trend, the value of probability describes that particularly this variable is stagnant at level.

Agriculture Sector Output is checked at level by including intercept, the value reports that this variable is not stationary at level by including intercept, then this variable is checked at level by including intercept and trend, the value of probability shows that this variable is not stationary at level. Agriculture Sector output is checked at first difference by including intercept, the value of probability reports that this variable is stationary at first difference by including intercept.

4.2. ARDL Model

4.2.1 ARDL approach with Agriculture sector output

The results of ARDL model about agriculture sector output are given in table 2.

Table 2: Results of ARDL about agriculture sector

Variable	Coefficient	Standard Error	t-statistics	Probability
Long run Results				
Labor Force	0.72	0.38	1.89	0.06
Investment in Agriculture	-0.06	0.0	-2.14	0.04
Investment in Manufacturing	-0.09	0.02	-3.15	0.00
Investment in Construction	0.12	0.02	5.99	0.00
Investment in Services	0.07	0.03	1.98	0.05
Investment in Mining	0.08	0.01	5.59	0.00
Constant	12.48	5.14	2.42	0.02
Short run Results				
D(LTLABF)	0.11	0.14	0.81	0.42

D(LINVESTAGRI)	-0.01	0.01	-0.90	0.37
D(LINVESTAGRI(-1))	0.04	0.01	2.43	0.02
D(LTRASNP)	-0.00	0.00	-0.68	0.49
D(LTRASNP(-1))	0.04	0.01	3.75	0.00
D(LCONSTR)	0.08	0.01	4.52	0.00
D(LINVESTSERVICE)	0.07	0.03	2.05	0.04
D(LMINING)	0.02	0.00	2.48	0.01
D(LMINING(-1))	-0.01	0.00	-1.96	0.06
CointEq(-1)	-0.81	0.14	-5.56	0.00
ARDL Bound Test				
Test Statistics	4.48	Significance 1%	Io Bound 2.88	I1 Bound 3.99

*Dependent: Agriculture sector

The results of ARDL model has been shown in table 2 that indicate total labor force is significant at 10 percent level with positive sign. This show that total labor force is positively related with agriculture sector output. One unit increases in total labor force will leads to 0.72 percent increase in agriculture sector output. The reason may be that if employed labor force is increased, level of production of goods and services will also increase accordingly. Or when more and more peoples are willing to work their income increased. In literature Bashir et al (2015) also find positive relation of employed labor force with agriculture sector output.

There is negative relation between Investment in agriculture and agriculture sector. Investment in agriculture is significant at 5 percent level of significance. If there is one unit increases in agriculture investment there will be 0.06 percent decrease in agriculture sector output. There are many reasons of this decrease in agriculture investment. Government launches a scheme of credits for farmer but farmers who have already rich use these credits on other goods or on luxuries. They do not pay attention on crops yield and those farmers who have low income and they have no access to credit that's why

day by day agricultural sector output is decreasing or natural disasters like heavy flood, intensive earth quack, all these factors to decrease the output of agricultural sector. Alfredo and Andraz (2006) also find out negative the relations of investment in agricultural with private employment, private investment and output. Investment in manufacturing is statistically significantly at 1 percent level indicates negative sign. This also shows that investment in the manufacturing sector negatively related with agricultural sectors output. If one percent unit investment is increased in industrial sector it will lead to 0.09 percent decrease in agricultural sector. Investment in the services sector is statistically significant and reaches at 5 percent level and it is also positively related with agriculture sector output. One unit increases in investment in services sector will leads to 0.07 percent increase in agricultural sector output. Whenever supply of water, farmer training centers in which they learn how to save crops diseases, effective use of pesticides to kill insects increase the output in the agricultural sector. If the Government constantly provides the facility of loans for the poor farmers ultimately their expenditure on crops will increase and it will directly increase the output of the agricultural sector. Ammad and Ahmad (2014) also find out positive relationship of the investment with service sector output.

The investment in the construction sector is statistically significant at 1 percent level of significance and it can also be positively related with agricultural sector output. 1 unit increases in the construction sector investment will lead to 0.12 percent increase in agricultural sector output. These results also consistent with the result of Ammad and Ahmad (2014).

The investment the in mining sector is positively related to the agricultural sector. The investment in mining sector is significant at 1 percent level of

significance. If there is 1 unit increases in investment in mining sector, it will lead to 0.08 percent increase in agricultural sector output. Whenever, investment in mining sector increases, labor force and labor and job opportunities in mining sector also increases. Laborers can earn more money and they can also increase their demands about various goods like clothes and food, houses and transportation facilities etc. ARDL bound test examined the long relationship among these variables. The F-statistics value is 4.48 lie above the upper bond value at 1% significant level.

4.2.2 INDUSTRY SECTOR WITH ARDL

The results of ARDL model about the output of industrial sector are given in table 3.

Table 3: ARDL with industry sector

Variable	Coefficient	Standard Error	t-statistics	Probability
Long run results				
Labor Force	0.20	0.63	0.32	0.74
Agriculture	0.17	0.05	2.93	0.00
Manufacturing	0.12	0.03	3.23	0.00
Construction	0.24	0.03	6.12	0.00
Services	0.52	0.07	7.08	0.00
Mining	0.06	0.02	2.18	0.03
Constant	2.82	8.44	0.33	0.74
Short run results				
D(LTLABF)	-0.31	0.17	-1.17	0.08
D(LTLABF(-1))	-1.02	0.18	-5.61	0.00
D(LINVESTAGRI)	0.06	0.02	3.27	0.00

D(LINVESTAGRI(-1))	-0.08	0.02	-3.64	0.00
D(LTRASNP)	0.00	0.01	0.23	0.81
D(LCONSTR)	0.03	0.01	1.66	0.11
D(LCONSTR(-1))	-0.08	0.01	-4.33	0.00
D(LINVESTSERVICE)	0.28	0.04	5.84	0.00
D(LINVESTSERVICE(-1))	0.12	0.04	2.46	0.02
D(LMINING)	-0.06	0.01	-5.88	0.00
D(LMINING(-1))	-0.06	0.01	-5.90	0.00
Coint Eq(-1)	-0.57	0.04	-13.10	0.00
ARDL Bound Test				
Test Statistics	16.27	Significance 1%	Io Bound 2.88	I1 Bound 3.99

Dependent: Industry sector

The results shown in table 3 reveal that total labor force is statistically insignificant at 10 percent level of significance but it can be positively related with output of the industrial sector. 0.20 is the elasticity of industrial sector with respect to labor force. These results are consistent with the study of Bashir et al (2015). According to the results, investment in agriculture is statistically significant at 1 percent level of significance and it is positively related with the output of the industrial sector. 1 unit increases in agricultural investment will lead to 0.17 percent increase in the output in the industrial sector. Whenever agricultural output increase, supply of raw material for various industries also increase because in industries most of the goods are produced by using agricultural output. When more and more goods are being produced in various industries the output of industrial sector increase or when investment in agricultural sector increase peoples' standard of living increase. So, increase in the demand of goods and services can be observed because

agricultural sector is the major source of employment in Pakistan and more than half population of Pakistan is engaged with agricultural sector.

Investment in manufacturing sector is statistically significant at one percent level of significance. One unit increases in manufacturing investment will certainly lead to 0.12 percent increase in industrial sector output. 0.12 is the elasticity of industrial sector with reference to investment in manufacturing sector.

Investment in the construction sector is positively related with industrial sector output. Investment in the construction is statistically significant at 1 percent level of significance. 1 unit increases investment in construction industry will definitely lead to 0.24 percent increase in output of the industrial sector. Whenever more and more factories are built in our country the more and more goods are produced at large scale. So, industrial sectors output sectors increases.

Investment in services sector can be positively related with industrial sector output and it is statistically significant at one percent level of significance. One unit increases in service investment will certainly lead to 0.52 percent increase in the output of the industrial sector. Whenever more people are educated, they find the new methods, techniques and technology which become helpful for the factories to increase their revenue and decrease input cost. So, output of industrial sector increases. Investment in mining sector is positively related with the output of industrial sector and it is statistically significant at 5 percent level of significance. One-unit increase in the mining sector investment will lead to 0.06 percent increase in industrial sector output. Increase in investment in mining sector increases the demand of labor force which directly effect at employment level. Whenever employment

level. These results are consistent with the results of Ammad and Ahmad (2014).

ARDL bound test examined the long relationship among the variables. The F-statistics value is 16.27 lie above the upper bond value at 1% significant level. It reveals that there is an existence of the long run association in industrial sector output model.

4.2.3 SERVICE SECTOR WITH ADRL

The results of ARDL model about service sector output are shown in table 4.

Table 4: ARDL with Service Sector

Variable	Coefficient	Standard Error	t-statistics	Probability
Long run results				
Labor Force	1.41	0.29	4.72	0.00
Agriculture	0.11	0.02	4.30	0.00
Manufacturing	0.02	0.01	1.24	0.22
Construction	0.18	0.02	7.75	0.00
Services	0.43	0.03	11.07	0.00
Mining	0.00	0.01	0.21	0.83
Constant	-13.70	3.90	-3.50	0.00
Short run results				
D(LTLABF)	0.30	0.11	2.57	0.01
D(LTLABF(-1))	-0.56	0.14	-3.95	0.00
D(LINVESTAGRI)	0.05	0.01	3.51	0.00
D(LTRASNP)	-0.01	0.00	-1.49	0.14
D(LCONSTR)	0.04	0.01	3.39	0.00

D(LCONSTR(-1))	-0.02	0.01	-1.41	0.16
D(LINVESTSERVICE)	0.31	0.03	8.13	0.00
D(LMINING)	-0.00	0.00	-0.82	0.41
CointEq(-1)	-0.63	0.04	-13.06	0.00
ARDL Bound Test				
Test Statistics	22.93	Significance 1%	Io Bound 2.88	I1 Bound 3.99

*Dependent: Service sector

Table 4 indicates that there is positive relation with total labor force and service sector output. Total labor force is found to be statistically significant at one percent level. One unit increases in total labor force will lead to 1.41 increases in service sector. In literature Bashir et al (2015) also found positive relations of employed labor force on industrial sector.

Investment in agricultural sector is related to be statistically significant at one percent level and it is positively related to the service sector. One unit increases in agricultural investment will lead to 0.11 percent increase in service sector output. Agricultural sector provides jobs to unemployed people of the economy and more than half labor force of the economy is engaged with agricultural sector. Whenever people engaged with agricultural sector income increase, they spend income on their child's education. Whenever literacy rate increases the output of service sector also increases. There is positive relationship between investment in manufacturing sector and service sector output. Investment in manufacturing sector is statistically insignificant at 10 percent level.

There is positive relationship between investment in construction sector and service sector output. Investment in construction sector is significant at one percent level. One unit increases in construction sector investment will lead to 0.18 percent increase in service sector output. There is also positive relationship between investment in services sector and its output. Investment in services sector is significant at one percent level. One unit increases in service sector will lead to 0.43 percent increase in services sector output.

There is positive relationship between investment in mining sector and services sector. Investment in mining sector is statistically insignificant at 10 percent level. Alfredo and Andraz (2006) also find negative relation of investment in mining on private investment

ARDL bound test examines the long relationship among the variables. The F-statistics value is 22.93 lie above the upper bond value at 1% significant level. This value reveals that there exists long run association among variables in services sector output.

5. CONCLUSIONS

The objective of the study was to examine the role of sectoral investment (investment on agriculture, transportation, construction & mining) on sectoral output (agriculture sector output, industrial sector output and services sector output) of Pakistan. Time series data from 1972 to 2016 was used to examine the impact of sectoral investment on the output of three sectors: agriculture, industry and services.

In this study, log-log forms of the models were utilized to see elasticities of variables with respect to other variables. All variables are taken in Pak rupees except labor force. For theoretical support, the study follows

Solow growth model. For that, labor force and investment are taken in the models. It was noted that investment in agriculture, services, construction and in mining sectors have significant positive effect on agriculture sector output.

It was also found that investment in agriculture, services, construction and in mining sectors have significant positive impact on industrial sector output. It was noted during the study that investment in agriculture, services, construction and in mining sectors have positive association with services sector output. ARDL approach and Bound test results show that there are positive relationship between the variables of three models in the long run.

is used to examine the existence of long run relationship. The values of F – Statistics in all the models are greater than upper bound value. It reveals that in agriculture sectors output model, industrial sectors output model and services sectors output; there is existence of long run association among all sets of variables. In the agriculture sector output model, labor force, investment in construction, investment in services, investment in mining are increasing agriculture sector output while investment in agriculture and investment in manufacturing sector have negative impact on agriculture sector output in the long run.

6. POLICY IMPLICATIONS

The policy implications of the study are given as under: -

► Government should pay attention to enhance investment in agriculture sector because agriculture sector is main and important source to increase employment opportunities in Pakistan and provision of raw material for industrial sector. Whenever the supply of raw material enhanced the production also increases. Most of the Pakistani export items depend on agriculture sector.

► Government should focus to bring improvement in the transport system because transport system is highly important for the investment. Government should focus on construction of the roads particularly in rural areas because due to unpaved roads in rural areas cause negative effect on agriculture sector.

► Government should increase the production of labor because when people are employed they produce more goods and services. Government pay attention on construction and mining industries to create job opportunities.

REFERNCES

Afonso António and Aubyn Miguel St (2008), Macroeconomic Rates of Return of Public and Private Investment Crowding-In and Crowding-Out Effects", *ECB; Working Paper Series No 864*, February 2008.

Alesina, A., S. Ardagna, R. Perotti, And F. Schiantarelli. 2002.Fiscal Policy, Profits, and Investment. *The American Economic Review 92* (3): 571–89

Alfred M Pereira, Oriol Roca-Sagales, Infrastructures and private sector performance in Spain, *Journal of Policy Modeling, Vol 23*, Issue 4, May 2001: 371-384

Ammad, S and Ahmad, Q. M. (2014). Dynamic effect of energy sector public investment on sectoral economic growth: Experience from Pakistan Economy, *Pakistan Development Review, 53*(4), 403 - 421.

Aschauer, D. (1989). Public investment and productivity growth in the group of seven. *Economic Perspective*, 17-25.

Awan, Abdul Ghafoor (2013). China's Economic Growth-21st Century Puzzle, *Global Disclosure of Economics and Business, Vol 2* (2):9-29

Awan, Abdul Ghafoor; Waqas Ahmad (2014). Role of Policies in Economic Growth: A case study of China's Economic Growth, *Global Journal of Arts Humanities and Social Sciences.Vol.2* (8):45-64.

Awan,Abdul Ghafoor & Anum, Vashma (2014) Impact of Infrastructure development on economic growth: A Case study of Pakistan, *International Journal of Development and Economic Sustainability, Vol 2* (1):1-15.

Awan, Abdul Ghafoor & Aslam, Atteqa (2015). Impact of Agriculture Productivity on Economic Growth-A case study of Pakistan.

Industrial Engineering Letters, Vol 5(7):27-33.

Awan, Abdul Ghafoor (2012). Emerging versus Aging Economies: A Comparative study of Advanced and Emerging Economies, *International Journal of Management Research and Emerging* Sciences, Vol 2 (1): 45-65

Awan, Abdul Ghafoor (2015) Comparative analysis of the Literature of Economic Growth in the perspective of Advanced and Emerging Economies, *Science International*, Lahore, Vol.27 (3):3579-3587

Awan, Abdul Ghafoor (2015). State Versus Free Market Capitalism: A comparative Analysis, *Journal of Economics and Sustainable Development*, Vol.6(1):166- 176.

Awan, Abdul Ghafoor (2015). Analysis of the impact of 2008 financial crisis on the economic, political and health systems and societies of advanced countries. *Global Journal of Management and Social Sciences, Vol (1)*:1-16

Awan, Abdul Ghafoor (2013). Environmental Challenges to South Asian Countries, *Asian Accounting and Auditing Advancement, Vol 3*(1):84-103.

Awan,Abdul Ghafoor (2010). Emerging a New Financial Paradigm, *IUB Journal of Social Sciences and Humanities, Vol 8* (2):73-98.

Baotai Wang (2004), Effectiveness of Government Expenditure On Private Investment:Canadian Empirical Evidence, *Empirical Economics Vol. 30*, Number 2 (2005), 493-504.

Bose Niloy, Haque M. Emranul And Osborn Denise R.(2007),Public Expenditure and Economic Growth: A Disaggregated Analysis For

Developing Countries, *The Manchester School Vol 75* No. 5 September 2007.

Devarajan S, Swaroop V, Zou H, (1996). The Composition of Public Expenditure and Economic Growth. *Journal of Monetary Economics, 37*: 313-344.

Dickey, D.A. and W.A. Fuller (1979). Distribution of The Estimators For Autoregressive Time Series With A Unit Root, *Journal of The American Statistical Association, 74*, 427–431.

Easterly, W. And Rebelo, S. (1993), „Fiscal Policy and Economic Growth: An Empirical Investigation, *Journal of Monetary Economics, 32:* 417-458.

Ener, Kilic and Arica (2013). The effects of public and private investments on sectoral output: A panel approach for the case of Turkey. *International journal of business and social science 9* (4), 170-178.

Engle, R.F., and C.W.J. Granger (1987), Cointegration and Error Correction Representation: Estimation and Testing, *Econometrica, 55*, 251-276.

Folster, S. And M. Henrekson (2001), Growth Effects of Government Expenditure and Taxation in Rich Countries, *European Journal of Political Economy, 45*: 1501 –1520.

Govt. of Pakistan (2016). Pakistan Economic Survey, Federal Bureau of Statistics, Statistical Division.

Govt. of Pakistan (2017). Handbook of Statistics on Pakistan Economy 2010, State bank of Pakistan.

Haque, S. T (2013). Effects of public and private investment on economic growth in Bangladesh: *An economic analysis.* 104-126.

Kandenge, F. T. (2010). Public and private investment and economic growth in Namibia. Botswana *journal of economics,* 2-15.

Keho, Y. And Desire, A. (2011). Transport infrastructure investment and sustainable economic growth in Cote d' Ivoire: A cointegration and causality analysis. *Journal of sustainable development, 6* (4), 23-34.

Ligthart, J. (2002), Public capital and output growth in Portugal: an empirical analysis, *European Review of Economics and Finance, Vol. 1*, No. 2, pp. 3-30.

Mahbubur,Karim and Ali (2005). Private investment and economic growth in Bangladesh: An empirical investigation. *Pakistan journal of social science 3(1),* 152-156

Mittnik, S. and Neumann, T. (2001). Dynamic Effects of Public Investment: Vector Auto regression: Evidence from Six Industrialized Countries". *Empirical Economics 26*,429-446.

Otto, G. and Voss, G. (1994), Public capital and private sector productivity, *The Economic Record, Vol. 70*, No. 209, pp. 121-132.

Parker, K. 1995.The Behaviour of Private Investment." IMF Occasional Paper No. 134. Washington, D.C.: *International Monetary Fund*.

Pereira Alfredo M and , Pinho Maria De Fatima(2011). Public Investment, Economics Performance And Budgetary Consolidation: VAR Evidence For The 12 Euro Countries", *Journal of Economic Development, Vol. 36*, Issue 1, Pages 1-20.

Pereira Alfredo M and Andraz Jorge M.(2003). On The Impact of Public Investment on The Performance of U.S Industries, *Public Finance Review , Vol 31* No1, January 2003, 66-90.

Pesaran, M. H., Shin, Y. and Smith, R. J. (2001). Bound testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, 16, 289 – 326.

Phillips, P.C.B. and P.Perron (1988). Testing For A Unit Root in Time Series Regression, *Biometrika, 75,* 335–346.

Saeed, Hyder. And A. Ali (2006). The Impact of Public Investment on Private Investment: A Disaggregated Analysis. *The Pakistan Development Review 45* (4): 639-663

Sturm, J. and De Haan, J. (1995), Is public expenditure really productive? New evidence for the U.S.A. and the Netherlands", *Economic Modelling, Vol. 12,* No. 1, pp. 60-72.

Uddin, M. M. and Aziz, M. S (2014). Effects of public investment on economic growth in Bangladesh: an econometric analysis. *Journal of economics and sustainable development 22*(5), 37-50.

Wang, B. (2004), Effects of government expenditure on private investment: Canadian empirical evidence, *Empirical Economics, Vol. 30*, pp. 493-504

Zepeda, Lydia, ed. Agricultural investment and productivity in developing countries. No. 148. *Food & Agriculture Org., 2001.*

CONTRIBUTION OF AUTHORS AND CONFLICT OF INTEREST

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