Achieving Elevated GDP Growth Rates in Pakistan: Which Sector is to Lead?

Nasim Akhter[a], Sarfraz Ahmed[b] and Muhammad Usman[c]

Abstract

The present research is on achieving elevated GDP growth rates in Pakistan: which sector is to lead? The intention of this study is to analyze the contribution of major sectors i-e agriculture, industry and services, towards overall GDP growth of Pakistan. Time series data ranging 1951 to 2014 were obtained from the State Bank of Pakistan. E-views, Excel, Statistics and Minitab packages were used. Stationary analysis was made by applying Augmented Dickey- Fuller and Philips-Perron unit root tests. The data was found stationary and OLS estimation technique was applied on unstandardized and standardized variables The analysis on unstadardized variables depicted that the services sector is significant with β_3= 0.46 (p-value 0.0000), agriculture sector with β_1=0.31 (p-value 0.0000) and industrial sector with β_2=0.23 (p-value 0.0000).All the predictors were found statistically significant at the 5 percent level of significance. ANOVA technique was applied to test the overall significance of the model and found significant with P=0.000. The estimated coefficients of standardized variables indicated that the (standardized) services sector is significant with β_3=0.54285 (p-value 0.0000,se=0.03312) and indicates that if (standardized) services sector increases by one standard deviation, on average, the (standardized) GDP will increase by 0.54 standard deviations. The (standardized) agriculture sector with $\beta 1$= 0.47247 (p-value 0.0000, se=02835) indicates that if (standardized) agriculture sector increases with one standard deviation, on average, the (standardized) GDP will increase by 0.47 standard deviations. The (standardized) industrial sector with β_2= 0.37123 (p-value 0.0000, se=03230) indicates that if industry increases by one standard deviation, on average, the (standardized) GDP will increase by 0.37 standard deviations. No multicollinearity, autocorrelation and heteroscedasticity were found. The models were found stable by applying model stability tests (CUSUM).

Introduction

Achieving economic growth is one important macroeconomic indicator for which every country struggles (Faridi, 2012). Economic growth is affected by major sectors positively and negatively (Lucas, 1988; Romer, 1990; Grossman & Helpman, 1992; Barro, 1991; Knack and Keefer, 1995; Grier and Tullock 1989; Gallup et al., 1999) depending upon the nature of policies.

During sixties the policies were intended for agriculture for elevated expected growth and focus was to; (1) modernization of rural technologies to get proficient agricultural output and processing,(2) improve research capability and encourage the utilization and transmit of new technologies, as biotechnology, to sustain enhanced agriculture production, (3) introduce improved and high yielding seeds, (4) for food storage and preservation, adaptation of improved technologies, (5) build up and put into practice suitable irrigation techniques in all agro-ecological zones, (6) green revolution through improved seeds, pesticides, herbicides and high yielding varieties (HYV) to boost the rural economy. Then during eighties policies were put forward to boost up the industrial sector as; (1) adaptation and implementation vital technologies, (2)

[a] Ph.D Scholar, Preston University Islamabad, Pakistan
[b] Preston University Islamabad, Pakistan
[c] Assistant Professor, Department of Management Sciences, University of Gujrat

promote R & D to develop tools, equipment and machinery, (3) promote quality assurance in manufacturing, (4) generate inducement to encourage investment in R&D by the private sector, (5) smooth and progress capacity building in all science and technology areas, for improved state development i-e engineering, (7) augment Industrial technology development infrastructure (8) support recyclable material technologies to minimize industrial waste.

Finally policies for the services sector include (1) supporting and strengthening the banking sector to facilitate financial institutions,(2) develop transportation & communication (3) support the private sector to be more helpful, proficient and competitive in the transport Industry, (8) removing barriers to trade and investment. Due to instable political situation in the country to some extent, these policies implemented by the governments. **T**he overall economic growth is contributed by all sectors mainly agriculture, industry and services.

Pakistan is an agricultural based economy and extraordinary augmentation observed in the services sector of the economy. The contribution of service sector in GDP has gradually increased from 37.18 percent in 1950 to 58.14 percent in 2014. Whereas other sectors of the economy remained dismal. During last three and half decade the gross domestic product has experienced substantial changes. The commodity sectors (agriculture& industry) contributed in GDP during 1950 by 62.82 percent has decreased in 2014 to 41.87 percent. The industrial and services sectors portrayed relatively not as much volatility as the agriculture sector faced. The economy of Pakistan has undergone rapid structural transformation from agriculture towards industry and services.

Figure1.1: Trends in the sectoral share (1950-2014)

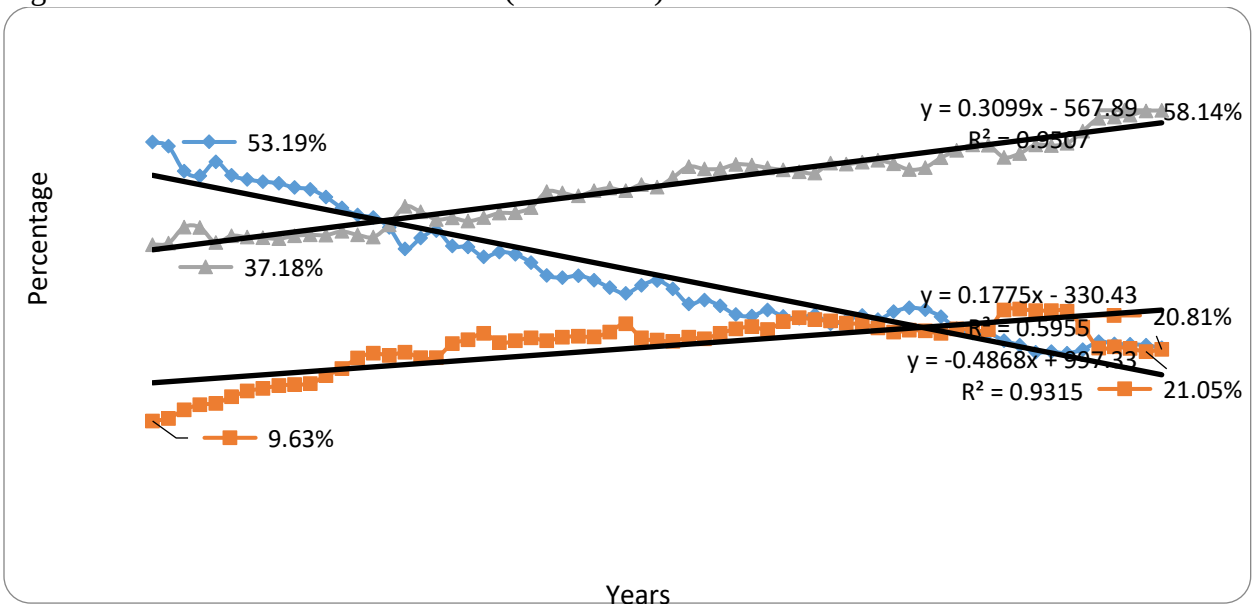

Figure 1.1 is an evidence of structural transformation from agrarian to services based economy. A declining trend in agricultural share starting with 53.19 percent during 1950 dropped to 21.09 percent during 2014. Fluctuations, rising and declining trends in industrial share (percent) to gross domestic product started with 9.63 percent during 1950, highest with 27.10 percent during 2005 and then declined to 20.81 percent during 2014.Overall rising trend is observed over the study period. An upward trend in services sector share (percent), starting with 37.18 percent during 1950 and by accelerating its share by 58.14 percent during 2014.An increase in the share of services sector is an indicator of the economic development process in Pakistan as the literature explains that the share by services sector is high in developed economies as compared to developing economies.

Figuer 1.2: Structural transformation of Pakistan economy(1950-2014)

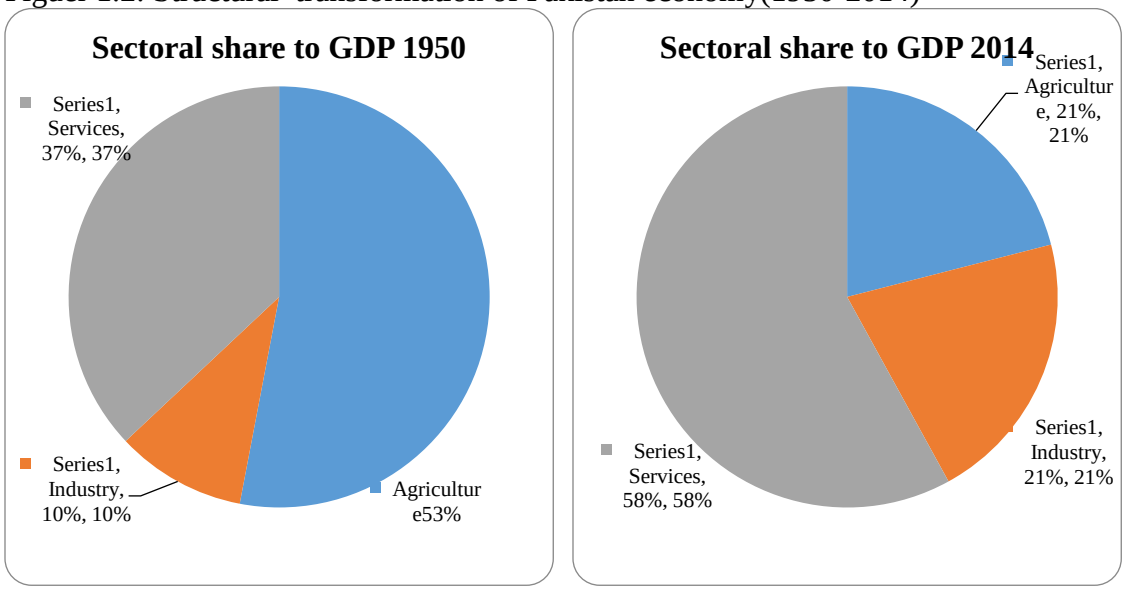

Figure 1.2 is the presentation of the structural transformation and emergence of Pakistan economy from agrarian based to services based. Approximately it is a reversal trend by percentage share of agriculture,industry and services sectors to gross domestic product. During 1950 the contribution of agriculture to gross domestic product was 53 percent, contribution of industry to gross domestic product was 10 percent and contribution of services to gross domestic product was 37 percen. But during 2014 the contribution of agriculture to gross domestic product was 21 percent , contribution of industry to gross domestic product was 21 percent and contribution of services sector to gross domestic product was 58 percent.

Different governments implemented the policies to make stronger these sectors in order to efficiently and professionally strengthen their abilities to achieve elevated growth rates averagely above 8% , but regret ably not achieved due to several internal and external factors The question then is which sector of the Pakistan economy is to lead this drive?.Being developing country with inadequate budget the minute that is accessible have to therefore be used proficiently. This means that the strategic sectors of the Pakistan economy should get priority or preference over the other sectors. Hirschman (1958) recommended that to get accelerated growth rates the key sectors of the economy should be prioritized for investment.

Objectives of the study

The study has following objectives

- To find out the impact of agriculture on the annual GDP growth of Pakistan
- To find out the impact of industry on the annual GDP growth of Pakistan
- To find out the impact of services sector on the annual GDP growth of Pakistan
- To find out the interrelationship between agriculture , industry and services sectors.

Scope of the study

The study will help in the following ways:

- The study will help policy makers regarding policies formulations.
- The study will add up the literature of the relevant topic.

- The study will provide base to researchers regarding agriculture, industry and services sectors in future.

Literature Review

Rosenstein-Rodan (1948) presented the big push theory of development. According to this theory large scale industrialization and infrastructural development can be the engine of growth and development of an economy. Large scale industrialization and infrastructural development are considered at the same time as the center piece of the theory. He suggested that more investment is needed simultaneously in agriculture, industry and services sector. According to Paul Rosenstein-Rodan, the big push needs to come from the state to escape the low-level of equilibrium trap (Gillis et al., 1992).

Nurkse (1953) emanated the balanced growth theory of development. The theory advocates the growth of all sectors of the economy simultaneously. The balanced growth hypothesis recommends accelerating growth process through simultaneous investment across the agriculture, industry and services sectors of the economy at the same time. For the growth of the economy exports cannot be considered as a source (Nurkse, 1958). He recommended that the key for the development is new technology, machines and production processes leading to domestic industrialization. The author concluded that large scale industrial investment would generate large scale demand which ultimately leads to balanced growth (Gillis et al., 1992).

Lewis (1954) is considered as the pioneer of explaining the vibrant correlation between agricultural and industrial development of an economy. The argument was that growth in agriculture sector has a direct inspiring impact on industrial growth through its onward and backward supply demand linkages. The same as industry depends upon the growth of agriculture sector in terms of resource outpouring (e.g. capital, labour and raw material). Therefore two-way reaction linkages (i.e. a bidirectional fundamental relationship) between these two sectors which as a result leads to greater productivity in the use of resources, and ultimately sustainable economic growth.

Hirschman (1958) presented the theory of unbalanced growth. This model is considered as an approach of development for the underdeveloped countries (like Pakistan) and is a short term strategy for economic growth. The unbalanced theory seeks to accelerate the process of growth through imbalances in the economy. The theory claims that investment should be made in strategic sectors of an economy rather than all the sectors concurrently. Consequently the other sectors of the economy would develop themselves automatically through "linkage effect". Also according to Rostow and Hirschman, a key sector needs to be identified for a sustained economic expansion and progression. Now the question, which sector is to lead in the case of Pakistan? is the essence of current study.

Rostow (1960) claimed that economic modernization occurs in five basic stages through which all societies pass as; traditional society, transitional stage, take-off stage, drive to maturity stage and high mass consumption. According to Rostow, the take off stage is the critical phase of development. During this stage sustained growth to be realized, net investment rates from five percent to ten percent of Gross National Product (GNP) national product have to increase. Political, social and institutional framework has to be built. For an unremitting run of financial resources, through higher saving rates the financial resources must be accumulated internally.

Dutt and Lee (1993) analyzed the contribution of services sector in employment. The researchers employed the regression analysis technique to accomplish the study. Researchers used cross section country level data from three decades 1960s, 1970s and 1980s.They regressed the

GDP growth rates on services sector's share in employment. They explored negative and significant coefficients and concluded that comparative increase of the service sector's share in employment and GDP growth rate were associated negatively.

Katircloglu (2002) empirically explored a positive association between economic growth and agriculture, services, industry in case of Turkish Republic of Northern Cyprus. Annual time series data from 1977 to 2002 were used. To check the stationarity Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests have been employed by including the variables as; GDP, agriculture, industry and services in the study the researchers investigated co-integration and fundamental relationship between the overall economic growth and the sectoral growth in North Cyprus. Political isolation in the Turkish Republic of Northern Cyprus (TRNC) was major reason of worse circumstances in the country since 1974. Enormous economic and social precipice between Turkish Cypriots and Greek Cypriots emerged due to the political isolation. The study declared the agriculture sector as the backbone of the economy of North Cyprus. The researchers found a long run relationship between the industrial and agricultural sectors and investigated that development of agriculture sector provides direction to the industry as agriculture sector was supplier of raw material to the industrial sector. However the study explored no direction to the economic growth by agriculture sector. The researcher found co- integration between the industrial output & services sector and real GDP. Additionally the study explored the existence of a unidirectional causation from real GDP to industry and services output.

Wilber (2002) conducted a study of twenty five countries of Organization for Economic Cooperation and Development (OECD) by using panel data ranging the period from 1960 to 1994. The researcher tried to investigate the association between the services sector expansion and overall economic growth and explored a causal relationship between services sector growth and overall economic growth and causality sprints from services sector towards overall economic growth. The researcher found that an extension of the services sector and overall economic growth was negatively associated with each other but not all services retard economic growth. The study portrayed a positive correlation that exists between producer services and overall economic growth, while negative correlation was found between consumer & government services and the overall economic growth.

Rashid(2004) conducted the study to explore empirically the interrelationship amongst agriculture, industry and various subdivisions of the Services Sector**.** The study investigated and identified the key growth stimulating sector having strong backward and forward linkages in the economy. To accomplish the research Time series data ranging 1971 to 2002 were used. The inter-sectoral linkages were estimated through Ordinary Least Square (OLS) regression method. The researchers applied Granger causality Test **t**o determine the causality direction among the growth of different sectors of the economy of Pakistan. The study explored the crucial role of the industrial sector in determining the overall growth. In addition researchers explored that the agricultural GDP growth depends upon the industrial & services sector's GDP growth. The neoclassical arguments were verified by the researchers as they concluded that higher productivity techniques applied in industrial sector, particularly in manufacturing tends to spill over to agriculture, so encouraging convergent tendencies in sectors of economy the productivity level augmented.

Singh et al., (2005) conducted a study to investigate in case of India that whether in future services sector will be the new engine of economic development? They estimated the situation by constructing six different kinds of simple linear growth equations and found that every equation indicated high relationship between different sectors' development and overall economic development. Among these equations four equations concerning industrial and services sectors

correspondingly adequately passed the investigative tests. The beta (β) coefficient for industrial sector was less than one, as suggested by Kaldor and for services sector was larger than one. Researchers found a strong correlation between agricultural growth and GDP growth , but this correlation was not as strong as that of between industrial sector and GDP growth.

Szirmai (2009) conducted a study to explore a significant sector which can be considered as the base for overall economic growth .He examined the basis of overall economic growth by using a fraction of developing economies of Asian and Latin America. Researcher focused mainly on capital concentration and development of production and labor productivity. The conclusion drawn by the researcher was yet again to some extent mixed/unclear. In broad-spectrum he founded the support intended for the engine of growth theory, but during several periods capital concentration in services sector and industrial sector was far above than in manufacturing. The study concluded that growth in agriculture sector was speedier as compared to manufacturing in advanced economies.

Obasan et al.,(2010) investigated the role of industrial sector in the overall economic growth of Nigeria. The key issue of the study was to look at the economic effect of industrial sector on economic development in Nigeria. Ordinary Least Squares method of estimation was applied by the researcher. Real gross domestic product was the dependent variable and industrial proxy by manufacturing output, exchange rate, inflation rate, interest rate and government expenditure plus other exogenous variables were autonomous/independent variables. A direct relationship between the endogenous variable and all the exogenous variables except for exchange rate and government expenditure was revealed by the study.

Rahman et al., (2011) revealed the linkages which exist among the different sectors of the economy. The major intention of the study was to examine the causal relationship among GDP, agriculture, industry and service sector output for Bangladesh. The time series data ranging from 1972 to 2008 were used. For econometric analysis researchers used granger causality, Wald tests statistics to examine the causal relationship. Bi-directional causality was found between GDP and agriculture sector; GDP and industrial sector, between industry and services sector. The same results were observed for services sectors. A uni-directional causality from industrial to agricultural sector and GDP to services sector was found. Finally, the results indicated that agriculture and industry were the influencing sectors of the GDP of Bangladesh, while services sector did not influenced the GDP.

Enu1 et al., (2013) conducted the study to examine the contributions of the agriculture, services and industry towards the economic growth in Ghana.Time series data ranging from 1966 to 2011 were obtained from the World Development Indicators (WID) 2012 series. To accomplish the study OLS estimation technique was used. The results illustrated a positive association among dependent variable (i-e GDP) and independent variables (i-e agriculture,industry and services sectors).It was analyzed by the researchers that all independent variables were statistically significant at the five percent significance level. The conclusion of the study was that the agriculture sector contributes mainly to the overall economic growth. It was recommended that to achieve higher GDP growth rate in Ghana the agriculture sector should be strengthened to lead the growth in the Ghanaian economy.

Sepehrdoust and Hye (2012) investigated the significance of the sectors of the economy. The researcher investigated that dynamics of the shares of industrial, agricultural and services are related to each other and to overall economic growth as well. The researchers looked at linkages among different sectors and economic growth of Iranian economy. The time series date ranged 1959 to 2010 was used to accomplish the study. The researchers employed autoregressive

distributed lag model (ARDL) and variance decomposition techniques. The researcher explored a long run association between sectors growth and overall economic growth. The results indicated a long run relationship exists when the variables GDP (Y), industrial value added (IN), agricultural value added (AG), services value added (SS) and oil & gas value added (O and S) stay to be dependent variables. The researchers explored that during long run, elasticity depicted that if there is one percent increase in value added of industrial, agriculture, services and oil & gas sectors it will cause a rise in the GDP by 0.219, 0,091, 0.431 and 0.156 percent respectively. Ajmair (2014) investigated the relationship between the industrial sub-sectors (mining and quarrying, fuel extraction industry, manufacturing, construction and electricity, gas and water supply) and economic growth of Pakistan. The study was accomplished by using the secondary data ranging 1950 to 2010. Augmented Dicky Fuller test was applied to check the stationarity of data. The Ordinary Least Square estimation technique was employed. The sub-sectors indicated positive relationship with GDP except mining and quarrying.

Alhowaish (2014) by using multivariate econometric model examined the dynamics of relationship among economic development and sectoral growth in eight Arab countries. It was found that the growth in either the industry or services sectors were main source of income of the most Arab economies, while a neutral effect about the agriculture sector has been observed in most cases. The study analyzed a stronger interaction between growth of the industrial and services sectors than the interaction between other sectoral pairs. Researcher explored the complicated linkages between the economic sectors of economy. Researcher argued that linkages were multi directional in nature and not an easy task to be predicting the contribution of these sectors to economic growth. Furthermore it varies strikingly from country to country.

Material and Methods

Data source

Secondary data ranging 1950 -2014 were collected from Federal Bureau 0f Statistics (Handbook of Statistics on Pakistan economy 2010), State Bank of Pakistan 2011, Pakistan Economic Survey (various issues)

Estimation technique used

The Ordinary Least Squares (OLS) was used because the data was stationary at level.

Empirical Results

Regression analysis on unstandardized variables

Descriptive statistics

Table 4.1: Descriptive statistics of GDP, agriculture, industry and services sectors (percent)

	agrigrt	Indgrt	servgrt	GDPgrt
Mean	4.035937	6.635938	5.834375	5.206250
Median	3.900000	6.700000	5.350000	5.200000
Maximum	27.70000	23.80000	29.90000	26.00000
Minimum	-8.800000	-12.10000	-0.500000	-1.500000
std. dev.	5.800174	6.077290	4.418188	3.815086

GDPgrt= growth rate of gross domestic product, agrigrt = growth rate of agriculture, indgrt= growth rate of industry, servgrt= growth rate of services

Source. Researcher's calculations using EViews

The table 4.1 indicates the descriptive statistics which indicates that on average industry with growth rate (6.635938) contributing highest growth rate as compared to services sector with growth rate (5.834375) and agriculture sector with growth rate (4.035937) indicating dawdling performance. On average GDP growth rate remained (5.206250) over the study period.

Correlation (Pearson) matrix

Table 4.2: Results of correlation (Pearson) matrix

	Agrigrt	Indgrt	servgrt	GDPgrt
Agrigrt	1.000000	-0.085235	0.236000	0.568941
indgrt	-0.085235	1.000000	0.522208	0.614437
servgrt	0.236000	0.522208	1.000000	0.848211
GDPgrt	0.568941	0.614437	0.848211	1.000000

GDPgrt= rowth rate of gross domestic product, agrigrt = growth rate of agriculture, indgrt= growth rate of industry, servgrt= growth rate of services

Source. Researcher's calculations using EViews

The table 4.2 indicates correlations among study variables. The GDP and services growth was highly and positively correlated (0.848211) followed by GDP and industry (0.614437) and GDP and agriculture (0.568941).Weak and negative correlation (-0.085235) was observed between agriculture and industry's growth rate. High and positive correlation (0.522208) was found between industry and services sector growth over the study period. Weak but positive correlation (0.236000) was observed.

Unit root tests

Initial requirement of a time series analysis is the information on the stationarity status of the variables. Augmented Dicky -Fullr (1979) and Philip Perron (1990) tests were applied once without trend and intercept, once with intercept and once with trend and intercept.

Table 4.3: Stationarity analysis –ADF and PP test results

Augmented Dicky-Fuller		Agrigrt	Indgrt	servgrt	GDPgrt
without intercept&trend	t-statistics	-0.909537 (0.3183)	-1.539231 (0.1153)	-0.946278 (0.3030)	-0.946278 (0.3030)
critical values	1%	-2.604073	-2.604073	-2.604073	-2.604073
	5%	-1.946348	-1.946348	-1.946348	-1.946348
	10%	-1.613293	-1.613293	-1.613293	-1.613293
with intercept	t-statistics	-8.045346 (0.0000)*	-6.762751 (0.0000)*	-7.838286 (0.0000)*	-7.838286 (0.0000)*
critical values	1%	-3.540198	-3.538362	-3.538362	-3.538362
	5%	-2.909206	-2.908420	-2.908420	-2.908420
	10%	-2.592215	-2.591799	-2.591799	-2.591799
with intercept&trend	t-statistics	-8.476819 (0.0000)*	-7.405166 (0.0000)*	-7.792480 (0.0000)*	-7.792480 (0.0000)*
critical values	1%	-4.113017	-4.110440	-4.110440	-4.110440
	5%	-3.483970	-3.482763	-3.482763	-3.482763
	10%	-3.170071	-3.169372	-3.169372	-3.169372
Results		I(0)	I(0)	I(0)	I(0)
philip-perron test					
without intercept&trend	t-statistics	-7.090165 (0.0000)*	-3.702914 (0.0004)*	-3.698024 (0.0000)*	-3.214287 (0.0017)*

critical values	1%	-2.602185	-2.602185	-2.602185	-2.602185
	5%	-1.946072	-1.946072	-1.946072	-1.946072
	10%	-1.613484	-1.613484	-1.613484	-1.613484
with intercept	t-statistics	-10.52070 (0.0000)*	-6.729979 (0.0000)*	-7.025595 (0.0000)*	-7.849577 (0.0000)*
critical values	1%	-3.538362	-3.538362	-3.538362	-3.538362
	5%	-2.908420	-2.908420	-2.908420	-2.908420
	10%	-2.591799	-2.591799	-2.591799	-2.591799
with intercept&trend	t-statistics	-12.53966 (0.0000)*	-7.386262 (0.0000)*	-6.995227 (0.0000)*	-7.800447 (0.0000)*
critical values	1%	-4.110440	-4.110440	-4.110440	-4.110440
	5%	-3.482763	-3.482763	-3.482763	-3.482763
	10%	-3.169372	-3.169372	-3.169372	-3.169372
Results		I(0)	I(0)	I(0)	I(0)

Significant at 1% .Table 1 shows that all variables are stationary at levels.

The regression equation (unstandardized variables)

To analyze the contributions of the agriculture, industry and service sector towards GDP growth econometric model was specified by following Enul et al., (2013) constructed for the economy of Ghana .By keeping in view the Pakisatn economy with minor ammendments model 4.1 was estimated.

$$GDPgr_t = \beta_0 + \beta_1 agrigr_t + \beta_2 indgrt + \beta_3 servgrt + \varepsilon_t \quad (4.1)$$

Where;

$GDPgr_t$ = growth of GDP (percent)
$agrigr_t$ = growth of the agricultural sector (percent)
indgrt = growth of the service sector (percent)
servgrt = growth of the industrial sector (percent)

Further the model contained

β_0 = defined as the intercept of $GDPgr_t$ if $\beta_1 = \beta_2 = \beta_3 = 0$)
β_s are parameters to be estimated
ε_t = error term (normally distributed with zero mean and constant variance).
β_1, β_2 ,β_3 tell us about the dependability of GDP growth on the agriculture ,industry and services sectors growth respectively

Expected results

The following were the hypothesis of the model

H_1=growth of agriculture affect the GDP growth, $\frac{\partial GDPGrt}{\partial AGRIGrt} > 0$.

H_2= growth of Industry affect the GDP growth, $\frac{\partial \text{GDPGrt}}{\partial INDGrt} > 0$.

H_3= growth of services affect the GDP growth, $\frac{\partial GDPGrt}{\partial \text{ServGrt}} > 0$

The expected affects of growth of agriculture, industry and services sector were positive
The equation of estimated regression (4.2) is given below.

GDP grt. = - 0.32 + 0.31 agri grt + 0.23 indgrt + 0.46 servgrt (4.2)

Table 4.4: Results of ordinary least square (OLS) method (unstandardized variables)

ANOVA					
	Df	SS	MS	F	Significance F
Regression	3	877.85	292.62	448.98	0.0000
Error	60	39.10	0.65		
Total	63	916.96			
Regression estimates					
Variable		Coefficent	St.Deviation	T Critical	P value
Constant		-0.32	0.182876	-1.800687	0.0768
Agrigrt		0.31	0.018645	16.66762	0.0000
Indgrt		0.23	0.020277	11.49319	0.0000
Servgrt		0.46	0.028597	16.39150	0.0000
R-Sq=95.7% ; Ad.R-Sq=95.5% ; S=0.8073 ; DW =1.89					

With adj R-Sq= 95.5 percent indicates goodness of fit and explains that 95.5 percent variations in dependent variable are due to the independent variables included in the model. F-value = 448.98(0.000000) indicates that all model variables are jointly and positively effecting the dependent variable it indicates overall significance of fitted regression model and was highly significant at 0.000 level of significance. D- W=1 .89 indicates absence of autocorrelation.

The table 4.4 shows the estimated coefficients of βs .The services sector is significant with β_3= 0.46 (p-value 0.0000), agriculture sector with β_1=0.31 (p-value 0.0000) and industrial sector with β_2=0.23 (p-value 0.0000). Theoretically, a positive relationship was expected between services sector and economic growth. The estimated result confirmed the same. As one percentage point increase in the services sector will cause GDP growth to increase by 0.46 percentage point. All the model variables statistically significantly affecting the dependent variable. Also a positive relationship between GDP growth and indgrt was expected. The value of β_0 = -0.32 which is intercept of the model and portray the average level of GDP growth when the regression coefficients are zero. On the basis of "t" values given in table 4.4 the hypothesis H_1,H_2, H_3 have been accepted.

Statistical diagnostic tests for testing the validity of OLS model

Multicollinearity/ Variance inflation factor criterion

Table 4.5 :Results of multicollinearity test

Variable	VIF	1/VIF
Servgrt	1.358498	0.736107
Indgrt	1.357058	0.736888
Agrigtr	1.056898	0.946165
Mean VIF | 1.25		

Results presented show no multicollinearity problem.

Autocorrelation test

Table 4.6 : Results of Breushch-Godfrey LM test

F-statistic	0.089199	Probability	0.914789
Obs*R-squared	0.196249	Probability	0.906536

The p value of obs*R-sq. (0.906536) is insignificant so no autocorrelation.

Heteroscedasticity test

Table 4.7: Results of Breusch-Pagan-Godfrey test

F-statistics	0.153863	Prob. F(3,60)	0.9268
Obs*R-Squared	0.488603	Prob. Chi-Square(3)	0.9214
Scaled explained SS	2.140503	Prob. Chi-Square(3)	0.5438

No hetroscdasticity because the prob. of Chi-Square (3) is 0.9214 which was insignificant.

Model stability test

Stability of the OLS model was checked through cumulative sum of recursive residuals (CUSUM)

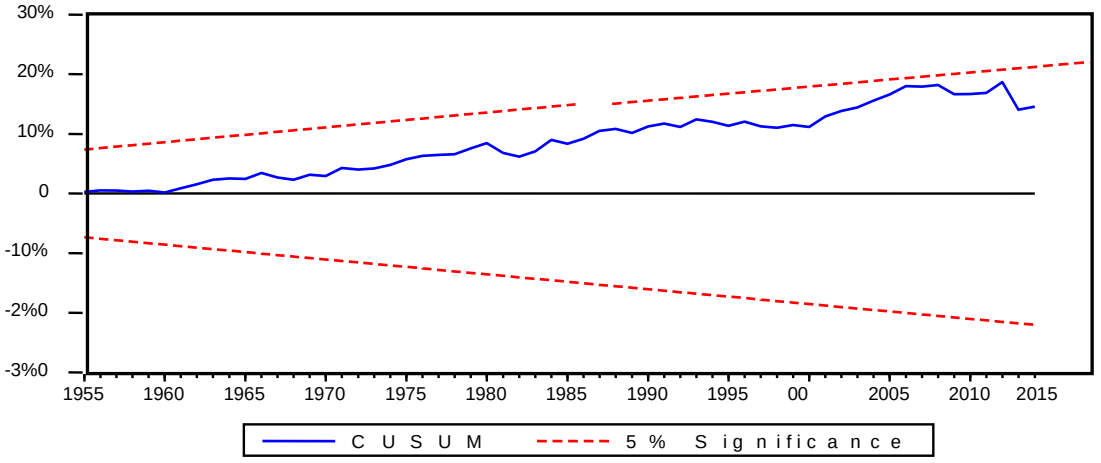

Figure 4.1: Commulative sum of recursive residuals (cusum)

The figure 4.1shows two dotted lines at 5 percent significance level and the plotted curve was within the these lines indicating a stable model.

Transforming the variables into standardized form

To determine which sector is to lead the growth process of GDP of Pakistan, all the variables of interest were standardized at next step. As the objective of this regression analysis is determine the leading sector as recommended by Hirschman (1958) that to get accelerated growth rates the key sector of the economy should be prioritized for investment.

Descriptive statistics

Table 4.8: Descriptive statistics of GDP, agriculture, industry and services sectors (percent)

	Agrigrtz	Indgrtz	Servgrtz	GDPgrtz
Mean	-0.000312	-0.000469	0.000469	0.000156
Median	-0.020000	0.010000	-0.110000	-0.005000
maximum	4.080000	2.820000	5.450000	5.450000
minimum	-2.210000	-3.080000	-1.430000	-1.760000
std. dev.	0.999855	0.999821	0.999790	1.000685

GDPgrtz= standardized growth rate of gross domestic product, agrigrtz = standardized growth rate of agriculture, indgrtz= standardized growth rate of industry, servgrtz= standardized growth rate of services.

Source. Researcher's calculations using EViews.

The table 4.8 indicates the descriptive statistics of standardized growth rates of study variables with zero mean and constant variance.the mean value of standardized variables is zero and standard deviation

4.2.2 Correlation (pearson) matrix

Results 4.9: Results of correlation (pearson) matrix

variables	agrigrtz	Indgrtz	Servgrtz	GDPgrtz
agrigrtz	1.000000	-0.083381	0.236776	0.569381
indgrtz	-0.083381	1.000000	0.522283	0.614989
servgrtz	0.236776	0.522283	1.000000	0.848171
GDPgrtz	0.569381	0.614989	0.848171	1.000000

GDPgrtz= standardized growth rate of gross domestic product, agrigrtz = standardized growth rate of agriculture, indgrtz= standardized growth rate of industry, servgrt z= standardized growth rate of services.
Source. Researcher's calculations using EViews.

The table 4.9 indicates correlations among standardized variables of the study .The GDP and services growth was highly positively correlated (0.848171) followed by GDP and industry (0.614989) and GDP and agriculture (0.569381).The positive correlation among variables indicates the movement of variables in same direction. Weak but positive correlation is observed between agriculture and services growth rate. High positive correlation exists between the growth of industry and services sector over the study period.Negative correlation exists between agriculture and industry over the study period.

4.2.3: Unit root tests

Initial requirement of a time series analysis is the information on the stationarity status of the variables. Augmented Dicky -Fullr (1979) and Philip Perron (1990) tests were applied once without trend and intercept, once with intercept and once with trend and intercept.

Table .4.10. Stationarity analysis-ADF and PP test results

Augmented Dicky-Fuller		agrigrtz	indgrtz	Servgrtz	GDPgrtz
without intercept&trend	t-statistics	-8.142849	-6.813879	-7.103608	-7.901161
critical values	1%	-2.602794	-2.602185	-2.602185	-2.602185
	5%	-1.946161	-1.946072	-1.946072	-1.946072
	10%	-1.613398	-1.613448	-1.613448	-1.613448
with intercept	t-statistics	-8.043787	-6.758759	-6.380962	-7.836553
critical values	1%	-3.540198	-3.538362	-3.540198	-3.538362
	5%	-2.909206	-2.908420	-2.909206	-2.908420
	10%	-2.592215	-2.591799	-2.592215	-2.591799
with intercept&trend	t-statistics	-8.473402	-7.401659	-6.330095	-7.790654
critical values	1%	-4.113017	-4.110440	-4.113017	-4.110440
	5%	-3.483970	-3.482763	-3.483970	-3.482763
	10%	-3.170071	-3.169372	-3.170071	-3.169372
Results		I(0)	I(0)	I(0)	I(0)
philip-perron test					
without intercept&trend	t-statistics	-10.62243	-6.782735	-7.059977	-7.916676
critical values	1%	-2.602185	-2.602185	-2.602185	-2.602185

	5%	-1.946072	-1.946072	-1.946072	-1.946072
	10%	-1.613448	-1.613448	-1.613448	-1.613448
with intercept	t-statistics	-10.52280	-6.725697	-6.993099	-7.847735
critical values	1%	-3.538362	-3.538362	-3.538362	-3.538362
	5%	-2.908420	-2.908420	-2.908420	-2.908420
	10%	-2.591799	-2.591799	-2.591799	-2.591799
with intercept&trend	t-statistics	-12.53367	-7.382479	-6.928148	-7.798497
critical values	1%	-4.220440	-4.220440	-4.220440	-4.220440
	5%	-3.482763	-3.482763	-3.482763	-3.482763
	10%	-3.169372	-3.169372	-3.169372	-3.169372
Results		I(0)	I(0)	I(0)	I(0)

Note. Z= indicates standardized * denotes the rejection of the null hypothesis at 1 percent level of significance. values in Parenthesis are Mackinnon critical at which the hypothesis of unit root can be accepted or rejected. Legend: GDPgrtz= growth rate of gross domestic product, agrigrtz = growth rate of agriculture, indgrtz= growth rate of industry, servgrtz= growth rate of services
Source. Researcher's calculations using EViews.

Result statistics presented in table 4.10 indicated that all variables namely GDPgrtz, agrigrtz , indgrtz, servgrtz were stationary at levels so OLS estimation technique was applied.

The regression model (standardized variables)

To analyze the contributions of the agriculture, industry and service sector towards GDP growth econometric model with stsndardized variable was specified by following Enul et al., (2013) constructed for for the economy of Ghana .By keeping in view the Pakisatn economy with minor ammendments model 4.1 was estimated.

$$GDPgr_t.z = \beta_0 + \beta_1 agrigrz + \beta_2 indgrz + \beta_3 servgrz + \varepsilon_t \quad (4.3)$$

Where

$GDPgr_t.z$ = growth of standardized GDP (percent)
agrigrtz =growth of the standardized agricultural sector (percent)
indgrtz = growth of the industrial sector (percent)
servgrtz = growth of the standardized service sector (percent)
Further the model contained
β_0 = intercept ($GDPgr_t.z$ if $\beta_1 = \beta_2 = \beta_3 = 0$)
β_s are parameters to be estimated
ε_t = error term (normally distributed with zero mean and constant variance).

β_1, β_2 ,β_3 tell us about the dependability of GDP growth on the agriculture ,Industry and services sectors growth

- **Expected results**

The following are the expected results

H_1=growth of agriculture affect the GDP growth, $\frac{\partial GDPGrtZ}{\partial AGRGrtz} > 0.$

H_2= growth of Industry affect the GDP growth, $\frac{\partial \text{GDPGrtZ}}{\partial INDGrtZ} > 0.$

H_3= growth of services affect the GDP growth, $\frac{\partial GDPGrtZ}{\partial \text{ServGrtZ}} > 0$

The expected effects of growth of agriculture, industry and services sector were positive
The equation of estimated regression (4.4) is given below.

$gdpgrtz$= -0.000331+ 0.47 $agrigrtz$ + 0.37 $indgrtz$+ 0.54servgrtz (4.4)

Table 4. 11: Results of ordinary least square (OLS) method (standardized variables)

ANOVA					
	Df	SS	MS	F	F significance
Regression	3	60.313	20.104	448.98	0.000
Error	60	2.687	0.045		
Total	63	63.000			
Regression estimates					
Variable	Coefficent		St.Deviation	T Critical	P value
Constant	-0.0000		0.02645	-0.00	1.0000
Agrigrtz	0.47247		0.02835	16.67	0.0000
Indgrtz	0.37123		0.03230	11.49	0.0000
Servgrtz	0.54285		0.03312	16.39	0.0000
R-Sq=95.75 ; Ad.R-Sq=95.5% ; S=0.2116 ; DW =1.89					

GDPgrtz= standardized growth rate of gross domestic product, agrigrtz = standardized growth rate of agriculture, indgrtz= standardized growth rate of industry, servgrt z= standardized growth rate of services.
Source. Researcher's calculations using EViews.

R-Sq(adj)=95.5 percent indicates goodness of fit and explains that 95.5 percent variations in dependent variable are due to the independent variables included in the model. F-Statistics =448.98 (0.000000) indicate that all variables jointly effecting the dependent variable positively. It indicates overall significance of fitted regression model which was highly significant at 0.000 level of significance. Durban Watson stat= 1.89 indicates no serial correlation.

The table 4.11 shows the estimated coefficients of standardized variables. The (standardized)services sector is significant with β_3=0.54285 (p-value 0.0000,se=0.03312) and indicates that if (standardized) services sector increases by one standard deviation, on average, the (standardized) GDP will increase by 0.54 standard deviations. The (standardized) agriculture sector with β1= 0.47247 (p-value 0.0000, se=02835) indicates that if (standardized) agriculture sector increases with one standard deviation, on average, the (standardized) GDP will increase by 0.47 standard deviations. The (standardized) industrial sector with β_2= 0.37123 (p-value 0.0000, se=03230) indicates that if industry increases by one standard deviation, on average, the (standardized) GDP will increase by 0.37 standard deviations. Theoretically, a positive relationship was expected among sectors and GDP growth. The value of β_0 = -0.0000 which is intercept of the model and portray the average level of GDP growth when the regression coefficients are zero.In standardized regression model the intercept is always zero,as the Intercept= mean value of GDP-slope imes the mean value of regressor. In case of standardizesd variables the mean values are zero so intercept is zero.The standardized regression model is more effective as compared to unstandardized traditional model, as all variables are put on equal basis so the coefficients can measure the relative strength of regressors . On the basis of "t" values given in table 4.11 the hypothesis H_1,H_2,H_3 are accepted. From the above analyses, it can be inferred that all the three sectors are key to economic growth in Pakistan. However, the most impressed one is the services sector, followed by the agriculture sector and then, by the industrial sector. The services sector as leading sector of economy, having positive, significant and more influential coefficient (0.54).The analysis represents that services sector is the key sector for the GDP growth of Pakistan and should lead the economy.

Statistical diagnostic tests for testing the validity of OLS model

Multicollinearity/ Variance inflation factor criterion

Table 4.12: Results of Multicollinearity test

Variable	VIF	1/VIF
servgrz	1.349528	0.948
indgrz	1.344086	0.744
agrigrz	1.054852	0.741
Mean VIF =1.249489		

Results presented show no multicollinearity problem.

Autocorrelation test

Table 4.13:Results of Breushch-Godfrey or LM test

F-statistic	0.0755782	Probability	0.927110
Obs*R-squared	0.166807	Probability	0.919980

The p value obs*R-squareed (0.919980) is insignificant, no autocorrelation.

Heteroscedasticity test

Table 4.14 : Results of Breusch-Pagan-Godfrey test

F-statistic	0.156375	Prob. F(3,60)	0.9252
Obs*R-squared	0.496519	Prob. Chi-Square(3)	0.9197
Scaled explained SS	2.167480	Prob. Chi-Square(3)	0.5384

Table 4.14 is indicating p value of Chi-Square(3)= 0.9214) is insignificant so no hetrosedasticity..

Model stability test

For checking the stability of the OLS model cumulative sum of recursive residuals (Cusum) has been applied.

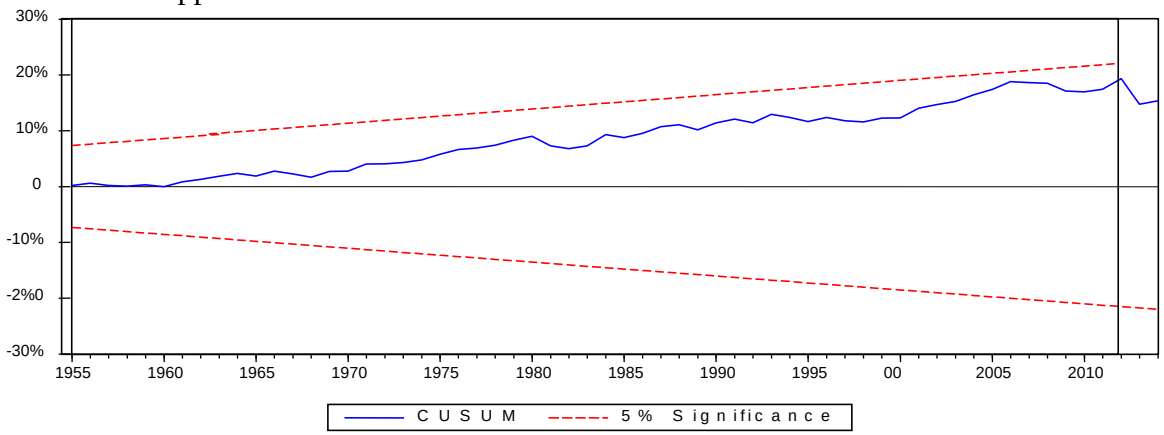

Figure 4.2. Commulative sum of recursive residuals (cusum) -test

The figure 4.2 shows two doted lines at 5 percent significance level and the plotted curve is within the these lines indicating a stable model.

Conclusion and Recommendations

The overall results indicate that services sector contributes most to the growth process of Pakistan economy the agriculture sector comes second and then the Industrial sector Statistically

all the explanatory variables are significant. Therefore, for Pakistan to attain higher GDP growth government should make structural changes in services sector as it is the engine of growth and among sub-sectors, wholesale and retail should be focused.

References

1. Ajmair, M. (2014). Impact Of Industrial Sector On GDP (Pakistan Case), *European Journal Of Contemporary Economics And Management, 1(1).*
2. Alhowaish, A. K. (2014). Sectoral Linkages and EconomicGrowth: Empirical Evidence from Eight Arab WorldCountries. *4th InternationalConference on Economics and Social Sciences, Istanbul.*
3. Barro, R. J. (1991). Economic Growth in a Cross-Section of Countries. Quarterly Journal of Economics. 106: 407 – 444.
4. Dutt, A. K. & K. Y. Lee (1993). "The Service Sector and Economic growth: Some Cross –Sectoral Evidence" *International Review of Applied Economics,* 7:311 – 329.
5. Enul, P., Havi, E. D. K., Gyimah, F. O., Attah-Obeng, P., Opoku, C.D.K. (2013). Achieving Higher GDP Growth Rates In Ghana: Which Sector Is To Lead? *Social Sciences and HumanitiesVol. 4(4).*
6. Faridi, M. Z. (2012). "Contribution of Agricultural Exports to Economic Growth in Pakistan" *Pakistan Journal of Commerce. Social. Science,* 6(1), 133 – 146.
7. Grossman, G. M & Helpman, E. (1992). Innovation and Growth in the Global Economy (2nd Edition.) *Cambridge, Mass: and London England*: MIT Press,
8. Gillis. (1992). Economics of Development. New York, W.W. *Norton and Company.*
9. Grier, K. B., & Tullock, G. (1989). An Empirical Analysis of Cross-National Economic Growth. *Journal of Monetary Economics; 24: 51 – 77.*
10. Gallup, et. al., (1999). "Georgrahy and Economic Development*".* CID working paper 1.
11. Hirschman, A. (1958). The Strategy of Economic Development. *New Haven, Yale University Press.*
12. Katircloglu. S. A. (2002). Co-Integration and Causality between GDP, Agriculture, Industry and Services Growth in North Cyprus: Evidence from Time Series Data, 1977-2002. *Review of Social, Economic & BusinessStudies, 5(6), 173 – 187.*
13. Knack, S. & Keefer, P. (1995). "Institutions and Economic Performance: Cross-Country Testsing Alternative Institutional Measures" *Economics and Politics*: 7: 207 – 227.
14. Lewis, W. A. (1954). Economic Development With Unlimited Supplies Of Labour. *The Manchester School, 22(2), 139–191.*
15. Lucas, R. E. Jr. (1988). "On the Mechanics of Economic Development" *Journal of Monetary Economics,* 22(1): 3 – 42.
16. Nurkse, R. (1953). Problems Of Capital Formation In Underdeveloped Countries. Oxford, Basil.
17. Nurkse,R.(1958)"Trade Fluctuations And Buffer Policies Of Low-Income Countries" *International Review for Social Sciences* Volume 11, Issue 2, pages 141–154.
18. North, D. C. (1959) " Agriculture in regional Economic growth" (Vol. 41). *Oxford journals Oxford University press.*
19. Obasan Kehinde A. & Adediran olanrewaju A. (2010) " The Role of Industrial Sector in the Economic Development of Nigeria" *Journal of Management and Society,* 1(2). .

20. Rashid, A. (2004). Sectoral Linkages: Identifying The Key Growth Stimulating Sector Of The Pakistan Economy. Pakistan. *International Institute Of Islamic Economics, Pakistan Business Review , 6(1), 10-39.*

21. Rahman, M.M., Rahman, M. S., & Hai-bing, W. U. (2011). Time Series Analysis of Causal Relationship Among GDP, Agricultural, Industrial and Service Sector Growth in Bangladesh. *China USA Business Review, 10(1), 9-15.*

22. Rosenstein-Rodan,P.N. (1948). Big Push Theory, *Rosenstein Rodan and Economic Development.*

23. Rostow, W. W., (1960). The Stages of Economic Growth: A Non-Communist Manifesto. *Cambridge University Press, Cambridge.*

24. Romer, P. (1990). "Human Capital and Growth: Theory and Evidence" *Carnegie – Rochester Conference series on public policy*, 32(199): 251 – 286.

25. Sepehrdoust & Hye, Q.M.A. (2012). An Empirical Studyof Inter-sectoral Linkages and Economic Growth. *Trends in Applied Sciences Research, 7(7), 494-504.*

26. Singh, A. & Sukti, D. (2005). Will Services be the new Engine of Economic Growth in India? *Centre for Business and Research, University of Cambridge. Working paper No. 310.*

27. Szirmai, A. (2009). Explaining Success and Failure in Economic Development. D.S. Prasada Rao and B. van Ark ed, *World Economic Performance. Past, Present and Future, Elgar, forthcoming.*

28. Sukti, D. ILO & Singh, A. (2005) "Will Services be the new Engine of Economic Growth in India? Centre for Business and Research, University of Cambridge. Working paper No. 310.

29. Wilber, S. (2002). Are Services Bad for Growth?. Evidence from a Penal of OECD Economics. Unpublished PhD. Thesis. Georgetown University Washington DC