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Full Length Research Paper

Foreign direct investment and sectoral growth of Pakistan economy: Evidence from agricultural and industrial sector (1979 to 2009)

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Weak economies strive hard to attract investments from their stronger counterparts. Foreign direct investment (FDI) is a buzzword in vogue for governments who face scarcity of capital to finance lucrative business projects. This present study is conducted to analyze the role of FDI on sectoral growth of Pakistan economy with special reference to agriculture and Industrial sectors for the period 1979 to 2009. Simultaneous models are developed to capture the joint effects of FDI on the said two sectors. Two Stage Least Square (2SLS) technique is used to estimate the role of FDI on sectoral growth. Augmented Dickey Fuller (ADF) test is used to identify the stationary condition of the variables. The study finds a significant negative impact of FDI on growth of agricultural sector. FDI positively affects the industrial sector but the impact is found to be statistically insignificant. Apart from FDI, a number of other factors like the availability of water for irrigation, public sector development program, and state of technology, growth of industrial sector and growth of service sectors have positive impacts on the growth of agriculture sector. The study confirms significant positive impact of the terms of trade, growth of service sector and growth of real GDP on growth rate of Industrial sector. It seems that exchange rate fluctuations and public sector development programs have suppressed the industrial growth in Pakistan as the study observes a significant negative relationship between them. It appears from the findings that real gross domestic product has contributed to the growth of services sector but surprisingly literacy rate in the country is found to have adversely affected growth patterns in the said sector. With the growth of industry and agriculture, it looks like the services sector has taken some positive influence. In light of the findings, it is recommended that investment friendly public policies are needed to attract more foreign direct investment in Pakistan. These efforts will not only foster growth of the industrial sector but also it will have positive effects on real gross domestic growth and other leading macroeconomic variables.

Key words: Foreign direct investment, agriculture, industrial, Pakistan.

INTRODUCTION

Pakistan's economy has lost significant growth momentum, especially during the last three years; economic growth averaged around 2.6% against a 5.3% in the preceding eight years. There are many possible reasons for the deceleration of growth momentum, such as the terms of trade shock of 2008, global financial crises, acceleration of war on terror, security hazards and high profile killings. Even comparative performance of Pakistan's economy in terms of growth of real GDP remained poor compared to the same income group countries given in Figure 1 (Ministry of Finance, 2010-2011).

Investment is the key to reviving economic growth but both total investment and fixed investment have shown a dismal picture. The total investment has declined from 22.5% of GDP in 2006 to 2007, to 13.4% of GDP in 2010

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Figure 1. Real GDP growth rates for the selected countries (2007/2008 to 2011/2012). Source: Economic survey of Pakistan, 2010-2011.

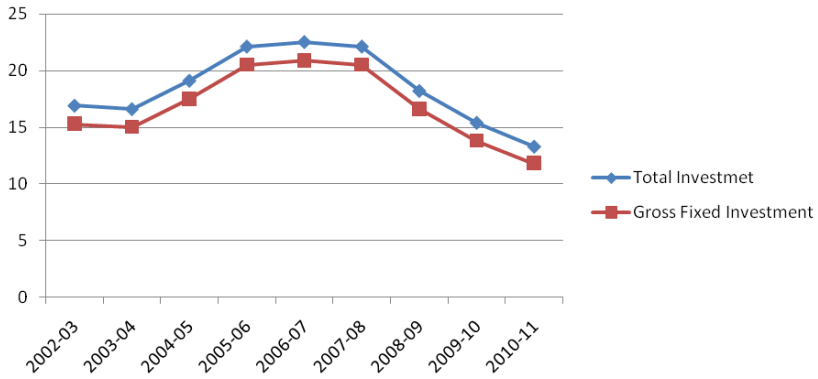

Figure 2. Total investment and gross fixed investment as percentage of GDP (2002/2003 to 2010/2011). Source: Economic survey of Pakistan, 2010-2011.

to 2011 and gross fixed investment has decreased to 18.1% of GDP from 20.4% of GDP last year, shown in the Figure 2 (Ministry of Finance, 2010-2011) . This fall in total investment and gross fixed investment in Figure 2 can be viewed as downward acceleration of inflow of foreign direct invesment in pakistan for the same period shown in Figure 3.

Pakistan is a developing country; it has a thriving economy which needs regional and global business partners not only to accelerate its economy but to offer incentives to investors who bring capital to business projects in different sectors. Foreign direct investment (FDI) takes place when capital is provided by foreign investors directly or in the form of enterprises establishment or support which often lead to direct involvement of the foreign investors in the enterprise's managements. Until the 1980s, many developing countries in the world avoided FDI due to its unseen complications, but in the recent years the hindrances for FDI have been reduced. In order to attract it, many countries offer a number of incentives like tax holidays, import entitlements, export subsidies, tax concessions, etc. Pakistan is faced with massive capital deficiency, it needs FDI to further expand its economy and accelerate business activities. There has been rhetoric by recent governments about FDI and its benefits; however, little can be captured in figures (Salman and Feng, 2009).

FDI bring uncountable positive effects in the economy, like it increases the investment capabilities, accelerates technological changes, and intensifies competition through local production, which fastens economic growth. Many research studies have been done to find out the impact of FDI in the economic growth, but still there is an ambiguity in the conclusions. For example, Singer (1950) and Griffin (1970) identified that the impact of FDI is negative in the developing countries' economy (Aitken and Harrison, 1999) in case of Venezuela, (Orphanidas and Williams, 2005), in case of Western European countries and US, and (Katrina et al., 2004) in case of transition countries figure out that FDI has no significant

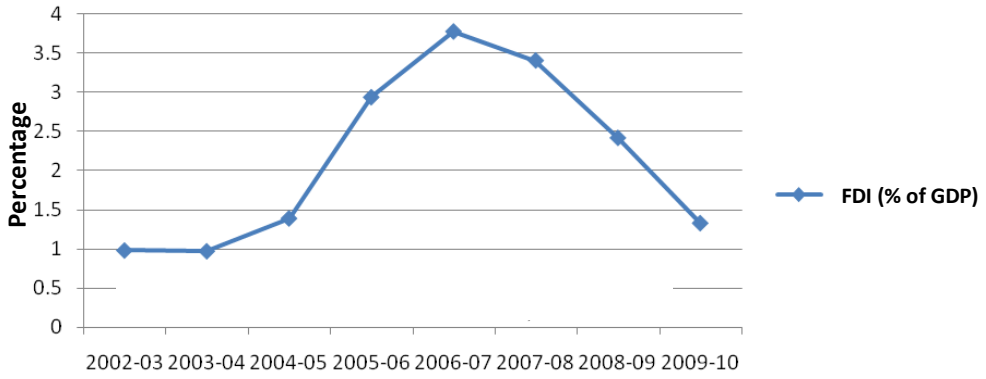

Figure 3: Foreign direct investment as a percentage of GDP in Pakistan. Source: Handbook of satistics 2009-2011, SBP Pakistan.

impact on the growth of economy, while Kokko (1994), Blomsrtom et al. (1992) and Caves (1974) reflected that there is a positive effect of the inflow of FDI on the growth of the economy. Bengoa and Shanches-Robels (2003) concluded positive effects of FDI on economic growth of Latin America but they believed that it depends on economic stability, adequate human capital and liberalized markets; Wang and Wong (2009) confirmed Bengoa and Shanches-Robels (2003) results. Jyun-Yi and chih-Chiang (2008) figured out the impact of FDI on the economic growth by using panel data for 62 countries and concluded that there is positive effect of FDI when the host countries are having adequate human capital, and the better stature of initial growth of domestic product (GDP). Panel data estimates of Gregorio (1992) for twelve Latin American countries concluded that there is significant positive effect of FDI on the economic growth; whereas, Fry (1993) estimation of pooled data confirmed negative effect of FDI on economic growth.

Chudnovsky and Lopez (1999) focused on short run and long run effects of FDI on economic growth. They concluded that FDI, in short run, can enhance the growth, when the manufacturing export is increased, this leads to a favorable balance of payment. In the long run, balance of payments would be worsened as local production goes under control of foreigners. Atique et al. (2004) and Zhang (2006) confirmed that there are expansionary effects of FDI on economic growth in terms of export promotions.

According to Xu (2000), Alfaro et al. (2004), Lee et al. (1998), Kokko et al. (2003), and Blomstorm and Kokko (2003), one can easily conclude that FDI can result in development of an economy. This can be done through the advancements in local financial markets, but only when the spillovers can be controlled. These authors also believe that improvements in educational level can farther dividends in this respect. Findlay (1978) confirmed the positive impact of FDI on economic growth via technology spillovers and concluded that it has the potential to accelerate economic growth of the host country. Salman and Feng (2009) examined the role of FDI inflow on sectoral growth, that is, agriculture, industry and service of Pakistan economy using vector autoregressive estimates for the period of 2000 to 2009. They confirmed that FDI has a positive correlation with growth in agriculture, industry and services.

The role of FDI in economic growth and development is analyzed mostly in aggregate framework as economic growth depends on sector wise performance of economy, and role of FDI in sectoral development is not yet analyzed properly. This paper is an attempt to analyze the role of FDI in sectoral growth of Pakistan's economy using two leading sectors, that is, agriculture and industrial sector. This paper contributes to literature in the following way: first using different methodology that is, it uses linear simultaneous equations system to capture interdependence between the sectors. If there is growth in agriculture sector due to inflow of FDI would lead to growth in industrial sector and growth in industrial sector, in turn, leads to growth in agriculture sector again. Such interdependence is formally estimated by using linear simultaneous equation system. Secondly, ADF test is used to identify the stationary condition of each variable which increases reliability of results.

METHODOLOGY

Econometric methodology

To estimate the impact of FDI and economic growth at sectoral level, that is, agriculture and industrial sector, the three regression equations are given as follows:

Real growth rate of agricultural sector (GAGR) can be a result of many variables but some important are given:

$$GAGR = \alpha_0 + \alpha_1 FDI + \alpha_2 SPWR + \alpha_3 PSDP + \alpha_4 TRCTRS + \alpha_5 GINDS + \alpha_6 SS + U_{1i} \quad (1)$$

Where "GAGR" is real growth rate of agriculture sector, "FDI" is foreign direct investment (in millions of dollars), "SPWR" represents the availability of water for irrigation (percent units), "PSDP" is public sector development program (in millions of rupees),

"TRCTRS" is number of tractors and other machinery (used as proxy for technology), "GINDS" is real growth rate of industrial sector, "SS" is real growth rate of service sector.

Real growth rate of industrial sector (GINDS) can be a function of some the following variables.

$$GINDS = \beta_0 + \beta_1 FDI + \beta_2 GAGR + \beta_3 TOT + \beta_4 ER + \beta_5 GGDP + \beta_6 PSDP + \beta_7 SS + U_{2i} \quad (2)$$

"GINDS" is the real growth rate of industrial sector," TOT" is term of trade, "ER" is the exchange rate (yearly average), "GGDP" is growth rate of real GDP.

Growth in Services Sector can be a function of some of the following variables:

$$SS = \lambda_0 + \lambda_1 GGDP + \lambda_2 GINDS + \lambda_3 GAGR + \lambda_4 LIT + U_{3i} \quad (3)$$

"SS" is the real growth rate of service sector "LIT" is literacy rate, as proxy for skill labor and other terms have same meaning as explained in Equation 3.

The functions (1, 2 and 3) are linear simultaneous equations system, Where $U_{1i,}$ U_{2i} and U_{3i} represent the error term, if corresponding system, the models (1, 2 and 3) constitute linear simultaneous equation system. As this study is based on the time series data, so the test of stationary condition is utmost important to avoid spurious results. So Augmented Dickey-Fuller (ADF) test is used in the following version:

$$\Delta y_t = \beta_0 + \beta_1 t + \delta y_{t-1} + a_i \sum \Delta y_{t-1} + U_{4i} \quad (4)$$

Whereas null hypothesis H_0: $\delta = 0$ (that is, non stationary) against alternative hypothesis H_1: $\delta \neq 0$ (that is, stationary)

The aforementioned linear simultaneous equations models include inter-dependence and joint effects, so it cannot be estimated by using OLS; if did, would lead to inconsistent estimates. So to provide consistent estimates, we are using two stages least square (2SLS) technique with estimated trend values of GAGR, GINDS and SS, from reduced form models, as an instrument to GAGR, GINDS and SS.

Justification of the variables

Variables included in the aforementioned system is based on theory and priory information e.g. in function 1, if foreign direct investment (FDI) increases than it will increase the real growth rate of agricultural sector (GAGR), because FDI leads to advancement of the technology and improvement of managerial skills which ultimately results faster real growth rate of agricultural sector (GAGR).

Increasing supply of water for irrigation (SPWR) and increasing allocation of public sector development program (PSDP) towards agriculture sector will boost its growth. Improving state of technology (that is, no of tractors as a proxy-TRCTR) and growing service sector (SS) tends to effect agriculture sector positively. Improvement in agriculture sector productivity especially if in terms of availability of larger quantity of quality raw material at low price would lead to attract more Foreign Direct Investment (FDI) and leave positive impact on industrial sector. If terms of trade (TOT) is favorable or improving than it means that prices of exported commodities are increasing compare to imported goods which would lead to increase profitability of firms producing domestically partially by increase in price in domestic markets and partially by increase in domestic demand, which ultimately results in more production and acceleration of growth of industrial sector (GINDS).

When there is an improvement (re-valuation) in the exchange rate (ER) and it can have a mix effects as under; first, when the ER improves, cost of importing of inputs will decrease, total cost will decrease which would result an increase in the profits and thus expansion and growth will be there. Second, when the ER improves, demand for our products in the international market will be decreasing due to high prices that lead to decrease in the profit as demand would fall and thus the growth of industrial sector (GINS) will be affected.

Increase in growth rate of real GDP (GGDP) means increase in domestic income, under certain assumptions, will result to more spending by consumers and government on goods and services which will leave positive impact on growth of industrial sector. Increase in PSDP for expansion in transport and communication system will open new markets which if accesses will increases sales various firms and industrial sector would grow faster.

If the growth of agricultural sector (GAGR) and growth of industrial sector (GINDS) are increasing, that will be leading to an increase in the growth of service sector (SS) because people will get jobs, they will be induced toward education and thus the service sector (SS) will improve. When the literacy rate is enhanced, the SS will improve because more educated and skill labors will enter into the employment's pool which causes it to bring improvement in the SS.

Data sources

The data, used in the research study, have been taken from the various issues, such as economic survey of Pakistan (Ministry of Finance), handbook of statistics (Federal Bureau of Statistics, Pakistan), and world development indicators (international money fund - IMF), Agricultural Department of Pakistan and Annual Reports (State Bank of Pakistan).

RESULTS AND DISCUSSION

This is based on times series data so test of stationary conditions of each variables is utmost important for consistent estimates which done by using Augmented Dickey-Fuller (ADF) test described by Equation 4. ADF test results are shown in Table 1. It shows the possibility of stationarity of the each variable, that is, growth of agriculture sector (GAGR), foreign direct investment (FDI) and availability of water (SPWR); they were stationary at level form. Whereas the rest of variables were stationary after taking their first difference like growth of industrial sector (ΔGINDS), service sector (ΔSS), public sector development program (ΔPSDP), number of tractor (ΔTRCTRS), term of trade (ΔTOT), growth rate of real GDP (ΔGGDP) and literacy rate (ΔLIT) but one variable, that is exchange rate (ER) which was stationary at the first difference of log.

Two stage least square (2SLS) estimates of model 1 shows that public sector development program (SPDP) and supply of water for irrigation (SPWR) have positive significant impact on real growth rate of agriculture sector (GAGR); whereas, FDI have negative significant impact on real growth rate of agriculture sector (GAGR) Table 2. Enhancement in technology measured by number of tractors (TRCTRS), real growth of industrial sector (GINDS) and growth of Services sector (SS) also have positive impact on growth of agriculture sector but are not statistically significant Table 4. The Durbin-Watson value

Table 1. The ADF test results of stationary form of variables.

Variables	tau - values	P-values	Remarks
GAGR	-4.67193*	9.117e-005	I (0)
ΔGINDS	-4.85869*	3.932e-005	I (1)
ΔSS	-5.37782*	3.232e-006	I (1)
FDI	-3.94868*	0.001712	I (0)
SPWR	-2.86131**	0.05001	I (0)
ΔPSDP	-3.20373**	0.0198	I (1)
ΔTRCTRS	-3.92013*	0.0019	I (1)
ΔTOT	-4.61032*	0.0001194	I (1)
ΔLog ER	-3.10981**	0.02586	I (1)
ΔGGDP	-4.83624*	4.363e-005	I (1)
ΔLIT	-3.64032*	0.005062	I (1)

*' **' *** show significance, at 1, 5 and 10% level of significant, respectively.

Table 2. 2SLS estimates of model 1, excluding intercept.

Variables	Co-efficient	t - values	P-values
FDI	-0.00083***	-1.874	0.0732
SPWR	0.0309*	4.615	0.0001
ΔPSDP	0.0002**	2.380	0.0256
ΔTRCTRS	0.0000123	0.3286	0.7453
ΔGINDS	0.081	0.4789	0.6364
ΔSS	0.40170	1.096	0.2839
R^2		0.6939	
Adjusted R^2		0.63	
F		9.068*	
P-value (F)		0.000032	
rho		-0.27	
Durbin-Watson		2.51	

*' **' *** show significance, at 1, 5 and 10% level of significant.

Is around two which indicate possibility of no autocorrelation of disturbances in Model 1.

Interestingly, growth of services sector (SS) has significant positive impact on growth of industrial sector (Table 3); whereas, it is insignificant in case of growth of agriculture sector. This may be due to a fact that normally skilled and educated people prefer to work in industrial sector rather than agriculture sector. Table 3 shows that growth of real GDP (GGDP) and terms of trade (TOT) has positive significant contribution to the growth rate of industrial sector. Exchange rate (ER) has negative insignificant contribution to growth of industrial sector whereas FDI and growth rate of agricultural sector has expansionary effects on growth of industrial sector but there are low statistical evidences of being different than zero.

The growth of real GDP and literacy rate has positive significant contribution to the growth of services sector; whereas, as regarding the growth of agriculture sector, we have found positive effect on growth of services sector and growth of industrial sector has negative effects on service sector but both are insignificant (Table 3).

The role of foreign direct investment (FDI) is mixed in this paper for example; it has negative significant impact on agriculture sector whereas it has positive insignificant on the growth of industrial sector. This mixed effect has been reported in many studies [(Aitken and Harrison, 1999); Venezuela case (Katrina et al., 2004; Blomsrtom et al., 1992; Caves, 1974)] and this paper confirm their positions. The positive aspects of FDI in the host countries are employment creation, technological progress, capital formation, to increase exports, to improve the management skill, positive spillovers by the multination enterprises and output growth. Whereas,

Table 3. 2SLS estimates of model 2, excluding intercept.

Variables	Co-efficient	t - values	P-values
FDI	0.0002	1.248	0.2245
GAGR	0.112	1.479	0.1527
ΔTOT	9.77*	3.46	0.0021
ΔLog ER	-6.701**	-2.290	0.0315
ΔGGDP	0.462*	2.821	0.0097
ΔPSDP	-0.00008**	-2.639	0.0147
ΔSS	0.501*	2.842	0.0092
R^2	0.80		
Adjusted R^2	0.755		
F	13.65*		
P-value (F)	7.61e-07		
rho	0.085		
Durbin-Watson	1.73		

*' **' *** show significance, at 1, 5 and 10% level of significant.

Table 4. 2SLS estimates of Model 3, excluding intercept.

Variables	Co-efficient	T-values	P-values
ΔGGDP	0.28*	6.245	1.31e-06
ΔGINDS	-0.002	-0.05	0.9588
GAGR	0.022	1.25	0.2199
ΔLIT	-0.21*	-11.07	2.46e-011
R2	0.91		
Adjusted R2	0.903		
F	67.81*		
Durbin-Watson	1.83		

*' **' *** show significant at 1, 5 and 10% level of significant.

possibility of negative aspects in the host countries are like the outflow of profit remittance by the foreign investors, capital flight which means the movement of the foreign investors to avail the risk free or stable opportunity, market power which means the ability of the multinational enterprises to manipulate the price by influencing the local product's demand and supply or both and able to affect the price to its benefit, negative spillovers generated by the multination enterprises and technological dependence.

CONCLUSION AND RECOMMENDATIONS

Main findings are FDI's inflow in Pakistan supports the industrial sector (GINDS) in term of growth; formation of capital and technical progress but this result is statistically insignificant. We have found out that the impact of FDI on growth of industrial sector is positive but insignificant whereas it had negative but significant effect on growth of agricultural sector (GAGR). Availability of water (SPWR), public sector development program (PSDP), number of tractors (TRCTR), growth of industrial sector (GINDS), and growth of service sector (SS) had positive effects on the growth of agriculture sector (GAGR), in which SPWR and PSDP were significant contributors. In case of growth of industrial sector (GINDS), we confirmed the positive significant effects of the terms of trade (TOT), growth of real GDP (GGDP) and growth of service sector (SS) on real growth rate of industrial sector (GINDS) whereas exchange rate (ER) and PSDP had negative significant affects on GINDS.

Growth of service sector (SS) effected positive and significantly from growth of real GDP (GGDP) and negative significantly by the literacy rate (LIT). GINDS had negative insignificant and GAGR had positive

insignificant effect on SS Table 4. On the basis of the study it concluded that the inflow of FDI is essential along with other variables for sectoral growth in the economy especially it is more useful in case of industrial sector.

On the basis of findings of the aforementioned study, it is suggested that government should make a proper incentive package to attract foreign investors to cover capital deficiencies in industrial sector at particular. This paper also suggests further research in area especially knowing the causes of negative significant impact of FDI on real growth rate of agriculture sector. This further enlarged the practicability of economic policy regarding attracting foreign investor to invest in agriculture sector.

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