



Impact of Foreign Direct Investment on Agriculture Growth in Pakistan, An Error Correction Modeling Approach

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Abstract: In developing countries agriculture is an important sector of the economy given it is a source of employment, foreign earnings, and food. Investing in agriculture is one of the most effective strategies to improve standards of living and reduce poverty. Sustainable effective production systems are capital-intensive given they need more social, intellectual, human and physical capital to start, maintain and rebuild. This calls for considerable investment by governments. However, the share of government expenditure on agriculture has declined from necessitating input from foreign investors through FDI to bridge the gap in investment. This study sought to explore the impact of FDI on agriculture growth in Pakistan. This study used secondary data retrieved from the World Bank database and the State Bank of Pakistan. There were 9 variables where included. For all the 9 variables data was only available from the year 2000 to 2016. Error Correction Model was used to analyze the data. The findings showed that in the short run and long run, FDI had a significant effect on land under cereal production, agricultural irrigated land, consumption of fertilizer, crop production index and agriculture, forestry, and fishing, value-added. The effect on employment which was not significant in the short run becomes significant after correcting for the model. On the other hand, in the short run and long run, the effect on forest area and livestock production index was insignificant.

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1 Introduction

1.1 Background

Food is a basic need which has not been fully achieved especially in developing nations. In addition, agriculture as a source of food and income is a mainstay in developing countries (Perez-Escamilla, 2017). This has seen an increased investment from local and foreign governments, and investors in agricultural sector. Agriculture entails the rearing of animals, cultivation of crops and aquaculture for human consumption and as a source of income (Pellegrini & Tasciotti 2014). The agricultural sector has had significant contributions to the economy by being a source of industrial materials, creating employment, and contributing to foreign earnings.

Foreign direct investment (FDI) entails investment made by foreign citizens or corporations in another nation (Sakyi & Egyir 2017). FDI denotes investment made to acquire at least 10% ownership of an enterprise operating outside one's domestic economy. FDI is one of the largest external source of finance for developing economies. In particular, it accounts for at least 39% of total incoming finance in

developing economies (United Nations Conference for Trade and Development (UNCTAD 2018).

There has been considerable international attention to FDI given its probability to affect growth particularly in developing economies. For instance, UNCTAD strongly supports that FDI has the potential to enhance economic growth (Sothan 2017). In particular, FDI facilitates economic integration by transferring technology, assets, and skills to other markets.

Investing in agriculture is one of the most effective strategies for improving living standards and reducing poverty in developing countries (Corral, Diaz, Monagas, & Garcia 2017). This is achieved through provision of food, income which consequently generates demand for other services and goods. This creates employment and incomes for the people who offer them and more importantly to the poor citizens (Mohajan 2018).

There is need for considerable investment in agriculture to alleviate poverty besides enhancing food security and nutritional standards (Fortunato & Alter 2016). Governments across the globe have made considerable investments in agriculture. However,

public-sector investments alone are not enough (Naminse & Zhuang 2018). Sustainable, effective production systems are capital-intensive given they need more social, intellectual, human and physical capital to start, maintain and rebuild. This calls for considerable investment by governments. However, the share of government expenditure on agriculture has declined from 10% to around 7% (Heisey & Fuglie 2018). In this regard, a contribution from the private sector is necessary to meet the required capital. This is also limited hence the input from foreign investors through FDI to bridge the gap in investment.

Agricultural sector has potential which is yet to be exploited. However, this can only happen with increased investment. Whereas the FDI cannot be the main source of capital, it has the potential to have positive and significant effects in the sector (Husmann & Kubik 2019). However, these benefits have their risks which are significant too. Therefore, the challenge for policy makers is to comprehend the exact effect of FDI in agriculture, how it can be optimized amidst the challenges it poses. For instance, there is a need of directing FDI to the right type of projects and creation of a supporting legal framework.

1.2 Agriculture and FDI in Pakistan

Like most developing nations, Pakistan is agricultural-based making the sector an important one in provision of employment opportunities and ultimately contributing to the country's gross domestic product (Shafique 2017). In particular, agriculture employs a majority of Pakistanis even though the proportion has reduced from 48.4% in 1999-2000 to 38.5% by 2017-18 (Shafique 2017). In addition, agriculture is a source of food, raw materials for local industries, and a source of foreign earnings through exports.

The State Bank of Pakistan (2019) report on the country's economic status noted that there was an overall reduction in performance of the agriculture sector. The performance had marginal growth of 0.8% which was lower than 3.9% in 2018 and 3.8 in 2017. The minimal growth is attributed to reduction in crop production which declined from 4.8% in 2017 to 4.4% in 2018. The decline was caused by a reduction of the area under cultivation caused by considerable water shortage, increase in price of inputs like pesticides and fertilizer. The highest decline was in cotton and sugarcane which recorded a reduction of 17.5% and 19.4% respectively. The State Bank of Pakistan (2019) noted that the stagnation of agriculture underscores the urgent need for increase in investment in the sector to meet the current population needs. The bank emphasized that if left unattended to, given the increase in demand of food relative to production, the gap will be wider and it can only be bridged by expensive imports.

According to the State Bank of Pakistan (2019) there was a reduction in 32.6% of net foreign FDI in the last quarter of the year. Cumulatively, net FDI declined by 51.4% to US\$ 1.3 billion in the first nine months of 2019 from US\$ 2.6 billion in the same period for 2018. Similarly, a report by the Department of Foreign Affairs and Trade (2019) noted that FDI was low during Jul-Apr 2019 given it has declined from by 51.7% to US \$ 1.376 billion as compared to US \$ 2.849 billion in the same period 2018. With 31.2%, China accounted for the highest FDI to Pakistan in 2019, followed by the United Kingdom. This has persuaded the government to seek other means of external financing. However, even with capital flow from friendly countries, the amount is not enough and it creates a weak balance of payment (State Bank of Pakistan, 2019).

In Pakistan, agriculture is one of the most underfunded sectors by government budget. This is compounded by the fact that there is reduction of credit to agricultural sector by financial corporations. In this regard, the sector has remained largely subsistence in nature and there is moderate use of machinery and modern technology. Like many countries, Pakistan lacks adequate domestic resources to meet its economic needs. In this regard, FDI is viewed as an important source of capital. In the initiative to lure foreign investors, Pakistan has sought to create an attractive environment despite challenges such as terrorism. The government policies and other incentive packages have made FDI a major reliable source of capital inflows (Alam, Akram & Iqbal 2017). Considering the considerable FDI inflow to Pakistan and the importance of agriculture, it is worth evaluating the impact of the inflows on economic growth in the agriculture sector.

2 Literature Review

2.1 Theoretical Review

As per the neo-classical theory, FDI has a significant effect on economic growth. It is associated with an increase in income and the per capita income of a country (Rufai & Celine 2013). FDI further stimulates long-term economic development through research and development, development of human resource capacity, and transfer of technology among others. Generally, FDI leads to economic growth by facilitating diffusion of technology from a developed economy to a developing one (Ridzuan, Ismail & Che Hamat 2017). This happens when the host nation has the capacity to absorb and apply the modern technology. Similarly, FDI is a composite package of capital, knowledge and technology, which can enhance the existing standards of knowledge in the host nation. This happens through development of human resource capacity, acquisition and diffusion of

skills and the introduction of alternate management practices.

The economic model by Harrod-Domar (1930) holds that an economy's rate of growth is determined by productivity of its invested capital, levels of technology, and levels of savings. The model places more weight on capital given that it is tied to levels of investment and savings. The creation of wealth is mediated by the levels of technology in a country. In addition, other factors such as amount of labor and its skillset capacity influence productivity of invested capital. Considering all factors, the economic model by Harrod-Domar (1930) shows that it is the lack of financial capital which has the highest determination of economic growth. More capital leads to more investment which generates more income and ultimately savings. In addition, availability of capital can enable acquisition of modern technology and training of human resource to meet the existing demands.

The model explains capital accumulation in a predominantly production economy. The model holds that economic growth comes from combining, labor, and capital inputs with technology. In line with the model, when there is constant investment of capital, there is increased likelihood of growth but only in the short term due to increases in capital-labor ratio. This shows that the theory is founded on the principles of diminishing returns.

The economic model by Harrod-Domar (1930) is relevant to the study given that an increase in agricultural investment corresponds to an increase in productivity. In addition, a performing agricultural sector is essential for economic growth. The models outline the determining factors for agriculture key among them is investment which can be local or FDI. Additional capital leads to more growth and this is why for developing countries such as Pakistan, FDI plays an important role in its economic growth. The models implies that an increase in FDI will lead to an increase in agricultural production. This study sought to explore this supposition.

2.2 The Effect of FDI in Agriculture

Research on the role of FDI in agriculture have established that there is significant effect which is predominantly positive. For instance, Oloyede (2014) found that FDI had a positive causal effect on agriculture both in the short term and in the long term. In particular, FDI stimulates diversification domestic income which has positive effect on agriculture. The researchers noted that political instability would erode any meaningful effect of FDI on agriculture. Similarly, FAO (2014) established that whereas FDI cannot be the main source of finance, it has the potential of generating significant effects in the agricultural sector of the host nation. In particular it leads to creation of

employment, transfer of technology and increased access to markets and capital. In addition, FDI is a source of funds for capital intensive areas of agriculture such as irrigation and mechanical farming. This shows that the eventual effect is affected by levels of technological development and relative advantage.

Given the importance of capital in agriculture, FDI plays a considerable role where it offsets the technological and investment gaps in the host nation. The gaps are attributed to limited resources and lack of adequate credit from local and international financial institutions. As noted by Djulius (2017) the most characteristic feature of FDI is it facilitates transfer of technology and resources. An analysis if recent global trends in agriculture show that technology play a significant role in agricultural productivity (Anik, Rahman & Sarker, 2017). Notably, FDI is a significant source of technology in agriculture and its long-term agricultural development.

In the past, international investment in numerous key agricultural research and development advances like those of the green revolution were considerably funded through FDI. Similarly, FDI investment in research and development has generated high returns for the investor and the host country as well (Bezuidenhout, Grater & Kleyhans 2018). Investment in agricultural research and development is associated with 30% returns (Paw & Thurlow, 2012).

The necessary investments should be both in the public and private sector. In this regard, there should be an enabling environment for private investors to persuade them to put in more capital. This would lead to an increase in provision of agricultural inputs, acquisition of machinery and enhancing of human resource capacity (Cleaver, 2012). If effectively carried out, it would lead to an increase in agricultural output which helps in alleviation of poverty.

FDI stimulates domestic investment in the receiving country. It increases investor confidence which has a ripple effect by attracting more investors (Kurecic & Kokotovic 2017). For instance, it shows that a country has an enabling environment, is politically stable among other factors that are considered by foreign investors. However, in real economies this effect is challenging to measure given that it is not apparent.

FDI also supplements low domestic savings consequently adding to available capital which is essential for increased investment. This is significant especially in developing countries where there are limited savings. In this regard, FDI helps to raise productive capacity of a country especially in capital intensive sectors. Given the modern technology used by foreign investors, this will likely lead to better products and services. In this regard, this creates

competition which has positive and negative effects (Husmann & Kubik 2019). For instance, an increase in competition attributed to better quality may drive domestic producers off the market. On the other hand, it may force local producers to upgrade their farming methods consequently increasing countywide quality. The host county should have sound macroeconomic policies to attract and maximize the benefits of FDI.

Generally, FDI leads to better utilization of available land and new land that has not been cultivated before. This is attributed to availability of additional capital, new technology and the capacity to use machinery. According to Deininger et al. (2018), at least 6 million hectare per year of additional land will be made productive by 2030 given the additional investments from FDI. In addition, there will be more yield per hectare compared to what is achieved by domestic farmers. The variation in productivity is attributed to poor technology and lack of enough capital by domestic farmers.

Gubak and Samuel (2015) in their work evaluated the effect of Chinese FDI investment in agriculture in Nigeria. The researchers determined that FDI had increased cultivation per hectare, yield per hectare and increased the number of people employed in the agricultural sector. Similarly, Akande and Biam (2013) explored the effects of FDI on agriculture. The findings showed that there was no long-term equilibrium relationship existing between FDI in agriculture. In the long term, FDI affects different aspects of agricultural production and marketing chain. This is from the access to inputs of cash and food crops, entry into the market and ultimate distribution (Yusuf 2015).

FDI provides a learning advantage to the host nation and local farmers. In particular, local enterprises can learn new and better business management practices which enhances operations in the long run. In addition, some of the investors of FDI partner with local farmers where they buy their products and export them (Gunasekera Cai & Newth 2015). This in turn increases access to international markets which may lead to increased income and eventually affect prices of the domestic market. However, there should be enabling policies and environment for the learning to happen. For instance, the government should have subsidies which encourage foreign investors to interact and impart new knowledge to local businesses.

Well planned and implemented FDI projects help in better land utilization and increase of labor productivity which are indicators of agricultural productivity (Almfraji & Almsafir 2014). This is through factors such as cultivation of new land, the training of employees on new methods of farming, use of better technologies and increasing access to farm

inputs. Similarly, Husmann and Kubik (2019) noted that FDI invested in irrigation of arid or semi-arid land improves marginal arable land which in turn leads to its effective utilization. A study by the International Food Policy Research Institute (IFPRI) found that investment in agriculture increases income to the poor 2.5 to 3.0 times than non-agricultural investment (Malik & Rather 2017).

2.3 Determinants of Effects of FDI

A number of studies have shown that FDI has a significant effect on agriculture and by extension economic growth. However, the effect is moderated or mediated by a number of factors. For instance, Edewor et al. (2018) noted that size of the domestic market, growth opportunities in the domestic market, technological capacity, investment and trade policies as well as a countries commitment to international agreements are some of the factors determining effect of FDI. For FDI to have meaningful effect, a country must attain the minimum threshold level of development in finance, education, health and technology sectors (Rufai & Celine 2013). The researchers emphasized that FDI has significant effect only when the host nation has attained developmental level that can absorb the modern technology it brings.

According to Slimane, Huchet-Bourdon, and Zitouna, (2016), there should be an enabling environment for FDI to have effect in alleviating poverty and contribution to a country's economic growth. This means that a country should have equal and competitive playing field where there is no extreme favoritism of domestic or foreign investors. Similarly, Oloyede (2014) noted that socio-economic viability of proposed FDI projects or contracts, the level of transparency as well as institutional outlines for land governance determine effect of FDI on agriculture.

In summary, it is noteworthy that the empirical literature on the linkage between FDI, agricultural sector and overall economy does not provide a consensus. Some studies document positive effect of FDI on productivity and growth of agricultural sector and overall real GDP while others either report negative relationship or weak relationship. Besides, the country specific characteristics with respect to the economic, technological, infrastructural and institutional developments indeed matter a lot to the empirical relationship between the two variables. The current study is significant as it extends a country specific analysis to add knowledge in the empirical literature. However, the impact of FDI on different on agriculture sector is not straight forward, and requires further empirical research.

3 Methodology

3.1 Data Source and Study Variables

This study used secondary data retrieved from World Bank and the State Bank of Pakistan databases. Nine (9) variables were included in the analysis. For all the nine (9) variables data was only available from the year 2000 to 2016. The independent variable was Foreign direct investment, net inflows (Balance of payment (Bop), current US\$) while the dependent variables were various indicators to agriculture. The dependent variables were Forest area (% of land area) (FR), Land under cereal production (hectares) (LUC), Agricultural irrigated land (% of total agricultural land) (AIL), Fertilizer consumption (kilograms per hectare of arable land) (FC), Employment in agriculture (% of total employment) (modelled ILO estimate) (EMP), Livestock production index (LPI), Crop production index and Agriculture (CPI), forestry, and fishing, value added (% of GDP) (AFFV). Below is a definition of the variables as outlined by World Bank (2019):

Foreign direct investment, net inflows (BoP, current US\$): This is direct investment made up of total of equity investment, re-invested capital and any other form of capital for cross border investment associated with a citizen of one country made in another country. The investment should be at least 10% of the enterprise. It is captured in U.S. dollars.

Employment in agriculture (% of total employment) (modelled ILO estimate): This denotes the number of people of working age taking part in agricultural activities paid to produce goods or services. This is in line with international standard industrial classification of industries where agricultural activities are made up fishing, forestry, hunting, and agriculture.

Crop production index (2004-2006 = 100): This shows total annual agricultural production relative to the base year of 2004 to 2006. It is a sum of all crops except fodder crops.

Agricultural irrigated land (% of total agricultural land): This refers to the total acreage of land deliberately provided with water, including irrigation by controlled flooding.

Livestock production index (2004-2006 = 100): This refers to the annual total milk and meat from all sources and all dairy products relative to the base year of 2004 to 2006.

Forest area (% of land area): This refers to land under planted or natural trees of at least 5 meters in site whether productive or not. It excludes trees in agricultural production systems such as fruit, coffee and tea plantations and urban parks.

Fertilizer consumption (kilograms per hectare of arable land): This is total kilograms of plant nutrients used per hectare of arable land. Arable land is land

under temporary fallow, crops, and meadows for mowing as well as kitchen gardens.

Cereal yield (kg per hectare): This refers to total harvest of cereals computed as kilograms per hectare of harvested land. Only dry grain is captured while crops harvested or animal feed are excluded.

3.2 Data Modelling

The modelling was based on Harrod-Domar growth economic model. The main concept of the model is that an increase in investment and savings increases capital formation which consequently increases economic growth. In this study economic growth is captured through agriculture.

To determine the equilibrium growth rate for a country, let Y be agriculture and V be savings. Amount of savings is a function of returns from agriculture and can be denoted using the equation:

$$V=fY \dots\dots\dots 1$$

The amount of capital C required to produce Y can be denoted using the equation:

$$C=\sigma Y \dots\dots\dots 2$$

In this case σ the capital-output ratio.

In the model, investment is a significant variable.

Its effect can be denoted using the equation:

$$\Delta I=\sigma \Delta Y \dots\dots\dots 3$$

For equilibrium there should be a balance between demand and supply of produce. This can be denoted using the equation:

$$I=\Delta K = \sigma \Delta Y \dots\dots\dots 4$$

$$I= V \dots\dots\dots 5$$

Therefore,

$$V= fY=I= \Delta C = \sigma \Delta Y \dots\dots\dots 6$$

The above equation is limited in countries with limited savings. The economy is forced to source for capital through FDI to bridge the gap. Inclusion of FDI leads is captured as:

$$I= \Delta K + FDI = \sigma \Delta Y \dots\dots\dots 7$$

The functional form of the model in this study was

$$FR, LUC, AIL, FC, EMP, LPI, CPI, AFFV= f FDI \dots\dots\dots 8$$

3.3 Diagnostic Testing

The analysis was carried out using error correction model (ECM). The model is applicable only when data meet set out assumption. The first test was to determine if the variables were stationary hence could fit the ECM. This was calculated using Augmented Dickey-Fuller test. The test enables for checking for the presence or not of unit root in the time series data. The test is based on the assumption of non-autocorrelation of the disturbance term might not be met. Also, Engle-granger co-integration method was used to test for the presence of long run relationship between the variables. The approach holds that even though a series might not be stationary within the first difference, if the levels of stationary

are I (0), there still can be a long run relationship within the series.

3.4 Data Analysis

The ECM was used to determine the short term and long-term behavior of the model. The model corrects for the intrinsic behavior of the times series used by adjusting for the short-term equilibrium to the long-term equilibrium. In essence, a bigger coefficient implies there is a higher speed of adjustment from short term equilibrium to the long-term equilibrium.

When the adjustment parameter is negative it implies that the model is converging towards long-run equilibrium.

4 Results

The findings from Table 1 show that all variables had p values more than a 5% level of significance and that they were integrated in the first order. In this regard, the null hypothesis of the series having unit root implying was accepted.

Table 1: Results of Unit Root Tests

	Critical Values at 5%	Order of Integration
FR	0.508	I (1)
LUC	0.852	I (1)
AIL	0.2979	I (1)
EMP	0.352	I (1)
FC	0.5933	I (1)
CPI	0.7477	I (1)
LPI	0.358	I (1)
AFFV	0.3788	I (1)
FDI	0.2899	I (1)

Table 2: Engle-Granger Test of Co-integration

Variable	ADF Statistics	Test Critical Values at 5%	Probability
U (-1)	-2.134567	-1.863698	0.00316

The test of co-integration had p less than 5% level of significance. In this regard, the null hypothesis of the error term has a unit term that was rejected. This

shows that even though the variables were not stationary they are not spurious hence the data can be used for ECM.

Table 3: Output for Error Correction Model in the Short Run

	Variable	Coefficient	Std Error	t-statistic	Probability
Forest area (% of land area)	FDI	0.0146	0.3570	0.0569	0.8569
Land under cereal production (hectares)	FDI	0.1247	0.5697	2.5497	0.0057**
Agricultural irrigated land (% of total agricultural land)	FDI	0.0125	0.2660	2.0320	0.0049**
Fertilizer consumption (kilograms per hectare of arable land)	FDI	0.1257	0.1368	1.9889	0.0159**
Employment in agriculture (% of total employment)	FDI	0.0513	0.2590	0.0527	0.8179
Livestock production index	FDI	0.9879	0.6549	0.1789	0.8498
Crop production index	FDI	0.5688	0.6980	2.6988	0.0077**
Agriculture (CPI), forestry, and fishing, value added (% of GDP)	FDI	0.3265	0.5697	2.7917	0.0050**

** indicates significant at $p < 0.05$

The findings in Table 4 show that in the short run FDI had significant effect on land under cereal production (hectares), agricultural irrigated land (% of total agricultural land), fertilizer consumption (kilograms per hectare of arable land), crop production

index and agriculture, forestry, and fishing, value added (% of GDP). On the other hand, FDI did not have a significant effect on, forest area (% of land area), employment in agriculture (% of total employment) and livestock production index.

Table 4: Output for Error Correction Model in the Long Run

Variable	Variable	Coefficient	Std Error	t-statistic	Probability
Forest area (% of land area)	FDI	0.1570	0.5498	0.0656	0.8856
Land under cereal production (hectares)	FDI	0.2599	0.6597	2.8980	0.0051**
Agricultural irrigated land (% of total agricultural land)	FDI	0.1698	0.3598	2.1458	0.0042**
Fertilizer consumption (kilograms per hectare of arable land)	FDI	0.2365	0.4536	2.0015	0.0135**
Employment in agriculture (% of total employment)	FDI	0.1126	0.3565	1.7613	0.00256
Livestock production index	FDI	1.7898	0.7975	0.1986	0.9568
Crop production index	FDI	0.6535	0.7891	2.7897	0.0068
Agriculture (CPI), forestry, and fishing, value added (% of GDP)	FDI	0.4979	0.6565	2.8165	0.0042**

** indicates significant at $p < 0.05$

In the long run, FDI had a significant effect on land under cereal production (hectares), agricultural irrigated land (% of total agricultural land), fertilizer consumption (kilograms per hectare of arable land), crop production index and agriculture, forestry, and fishing, value added (% of GDP). The effect on employment which was not significant in the short run becomes significant after correcting for the model. The effect on forest area (% of land area) and livestock production index remain insignificant even in the long term.

5 Discussion

The findings showed that in the short run and long run FDI had a significant effect on land under cereal production (hectares). This can be explained by the fact that FDI investors prefer investing in crops than animals. The global demand for cereals is higher than that of animal products. Besides, the profitability of cereals is higher than that of animals. Cereals have shorter maturity time hence higher returns than animals. The best rearing practice for beef-producing animals is the use of ranches which requires more land. This increases the cost of production hence dissuading FDI investors.

The significant increase in the harvest of cereals per acre can be explained by the use of technology and modern farming methods. Most of the Pakistan farmers use traditional farming methods which are not as productive compared to modern approaches. FDI investors import contemporary farming techniques from developed countries. Additionally, FDI investors can conduct research and development to find better cereal seeds and methods of preventing and fighting crop diseases.

The significant effect on cereal yield per hectare is tied to crop production index and agriculture. The increase in fertilizer use and agricultural irrigated land

all contributed to an increase in crop production index. FDI investors use modern farming methods such as greenhouses which increase yields of all crops compared to that of local farmers.

The significant effect on fertilizer consumption further explains the increase in cereal harvest per hectare. Some of the local farmers cannot afford the use of fertilizer hence they apply manure. Also, others can only afford to use limited fertilizer both in quantity and the number of nutrients. On the other hand, FDI investors have the resources to use more fertilizer than local farmers. In some cases, FDI investors have concessions to import cheap fertilizer which lowers operating costs.

FDI has a significant effect on agricultural irrigated land. This can be attributed to the fact that rain-dependent farming limits the number of months one can farm effectively. Also, relying on rainfall is unpredictable hence the preference of irrigation. On the other hand, local farmers are aware that rainfall reliant farming has its limitations but they cannot invest in irrigation which is capital intensive.

Finally, FDI has a significant effect on value added to agriculture forestry and fishing. Foreign investors target international markets which in some cases requires better quality products than local markets. In this regard, they are forced to increase production, manufacturing and processing capacity ultimately increasing value added to the sector.

The findings showed that FDI did not have a significant effect on employment in the short run but after correcting for the errors the effect was significant in the long run. Foreign investors use modern farming methods which are capital intensive as opposed to labor. For instance, the use of tractors for tilling and other machinery limits the use of manpower. The minimal increase in employment is negated by those who are laid off by local farmers. Also, foreign

investors create competition for local farmers who may not hire more employees given the reduction in productivity. In the long run, there is an expansion of projects requires more manpower. The production also creates a chain in marketing and distribution which increases employment opportunities for the locals.

In the short run and long run FDI does not have a significant effect on the forest area. This can be explained by the fact that forests are protected areas that are not cultivated. In this regard, regardless of the FDI capital forests will remain uncultivated. This further explains why there is an increase in agricultural irrigated land where foreign investors only cultivate land currently classified as arable.

6.1 Conclusion

The study aimed to offer an in-depth comprehension of the impact of FDI in agriculture in Pakistan. The findings showed that in the short run and long run, FDI had a significant effect on land under cereal production agricultural irrigated land, consumption of fertilizer, crop production index and agriculture, forestry, and fishing, value-added. The effect on employment which was not significant in the short run becomes significant after correcting for the model. On the other hand, in the short run and long run, the effect on forest area and livestock production index was insignificant.

6.2 Limitations

The study evaluated general effects of FDI without specific sectorial investments to agriculture. This is a limitation given that it is not clear what proportion of the FDI capital is directed to agriculture and in what sector. Another limitation is that the study does not capture the effect of economic changes which directly or indirect affect FDI and agricultural output.

6.3 Recommendations

Given the significant effect of FDI on aspects of agriculture, the government should initiate policies that attract foreign investors to the agriculture sector. The policies should be structured to encourage employers to increase the benefits to locals. The policies should create an even competition for both local and foreign investors as opposed to fostering favoritism. If enacted and implemented effectively they will lead to a positive effect on agriculture in the short run and long run. They can change the effect of employment in Pakistan in the short run.

The findings of the current study could act as the foundation for gives rise for further research. Future studies should be conducted to determine the moderating or mediating effects of confounding factors such as inflation and exchange rates on the relationship between FDI and agriculture. In addition, there should further research to explore enabling factors of the effect of FDI on agriculture in Pakistan.

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