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Original Paper

Factors Affecting Agricultural Productivity: An Evidence from Pakistan

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Abstract

The aim of this analysis into discovers the impact of institutional credit on agricultural productivity in Pakistan. The relationship among institutional credit score disbursement and agricultural productivity was calculated, the use of the Johansen co-integration technique. The results indicated that institutional credit, the face that insignificant had a positive effect on agricultural productivity. Modern and expensive agricultural inputs for example Tubular wells had 0.21 percent, fertilizers 0.49 percent pesticides 0.45 percent and seeds had a positive impact of 1.53 percent on agricultural productivity. On the basis of this evaluation, it might be suggested that disbursement of institutional credit score have to be promoted.

Keywords: Agricultural productivity, Institutional credit, Johansen co-integration, Labor force, inflation Pakistan

1. Introduction

The agricultural region has remained the primary quarter of the economic system, as it has contributed about 60 percent to Pakistan's gross domestic product. Agricultural production was the primary source of production in the economy, the share of the agricultural region in GDP was 56 to 60 percent, while it was recorded at 21.89 percent in 2015, the agricultural region it occupies a privileged situation in the economy involving forty four percent of employed labor force. Agricultural products are contributing significantly to exports of agricultural products and raw materials. The growth of the agricultural sector in Pakistan has indicate compared to different developed nation, however the supporting agricultural inputs, technological progress, infrastructure, land conservation and growth rate has been sustained.

In 2013 Agricultural sector indicated a positive growth rate of 3.4 percent Pakistani agricultural area faces distinct boundaries, challenges and distortions in distinct factors The lack of availability of credit and water, the rise in the prices of agricultural inputs, the lack of fertilizers and seeds, the problems of managing herbal resources, the shortage of energy and the fluctuating petrol's price. Farmers face problems in changing new methods because the lack of investment. Those problems with providing agricultural credit to farmers; it is a question of strengthening struggle for high productivity and economic development.

Informal sources made up of private, local, circle of relatives, lenders agencies. There are no authority's supports and policies for causal credit lending. The interest rate among the lender and the borrower is the most effective way communicated to obtain credit and one individual owns the policies and guidelines.

Zarai Taraquiati Bank, industrial banks, microfinance establishments and few non-governmental corporations. In 2006, the authority's usage an impressive method to improve the productivity via the farmer bundle improves. The authorities fall the profit margin from 16percent to 9 percent under the farmer agricultural credit score package. The Pakistan authorities farmers to buy inputs as, pesticides, seeds, machinery, fertilizers, the quantity disbursement has improve in the previous year

The farmers became to the impacts of advances in technology & combine their issues for buyer of inputs as seeds, purchase to agricultural machinery, In the viability of agricultural credit become found. In lots of preceding research formal credit is primary issue for growing production and creative thru the usage nice agricultural practices, seeds, pesticides. Sjah et al located that institutional credit from

industrial banks had a positive effects on agricultural economy. Researcher showed that impact of indirect and direct credit provision on agricultural creative that credit turned high effective in improving production than indirect credit.

Obilor (2013) also determined the high quality consequences of business banks' formal credit on agricultural development. Although the influences of lending on agricultural productiveness are properly studied, there are nevertheless now not many latest studies at the concern in Pakistan. In Table 1, the amount as distributed as credit rating within the agricultural region has stepped forward usually within the recent past; consequently, this examine is essential and timely, Depend on preceding precedents and investigate of literature,

2. Literature Review

Malik (1999) the farmer credit plays an important role in making the agricultural sector more productive and efficient in developing economies, and Pakistan is an exception. The lack of available credit or the capital constraints faced by farmers is one of the main problems in adopting modern technologies and improving efficiency in the agricultural sector. The lack of resource constraints represented not only the possibility of exploiting opportunities to increase productivity, but also the ability to smooth consumption

Feder et al. (1990) Farmers need funds immediately after the harvest period for the next growing season due to lack of cash and non-payment of the new crop. Modern agriculture consists of high-yielding seeds, fertilizers and plant protection measures. Most modern inputs are purchased in cash or on credit, which is why more and more farming families depend on credit markets. The efficient credit market has provided farmers with the opportunity to meet consumption needs and a balanced use of inputs, which have led to better farmers.

Adams et al. (1992) the easy availability and access to credit offers farmers and entrepreneurs the opportunity to diversify the agricultural sector through new investments or the adoption of new technologies. The rural credit market consists of the formal and informal sectors and plays an important and active role in the rural economy

Iqbal et al. (2003) the formal agricultural credit institutions in Pakistan are made up of Zarai Taraqiati Bank Limited commercial banks, Federal Cooperative Bank and also some non-governmental organizations. Agricultural credit was positively impact on productivity in Pakistan.

FAO (1998) given the distinctive features of agricultural credit, especially in developing countries, it was reasonable for the government to support the development of the agricultural and rural sector. The development of the agricultural sector could be achieved through the programming of an appropriate policy framework more efficient performance of the rural financial market.

Sial and Carter (1996) conducted a study on the efficiency of agricultural credit in Pakistani Punjab. It noted that mid-sized borrowers produced 49% more output than non-borrowers. Zuberi (1989) has studied that the impact of institutional credit comes from the financing of seeds and fertilizers.

Qureshi and Shah (1992) found that formal loans positively impact on production by the capital investments. The authors found that capital investment financing is more beneficial than seed and fertilizer financing. The efficiency of the production unit has two elements, namely technical efficiency and allocative efficiency. The first illustrates the ability of the production units to reach the maximum level of production while keeping the input level fixed. The latter describes the potential of production units to use optimal proportions of inputs for the same level of production. The product of both technical and allocative efficiency is total economic efficiency.

3. Materials and Methods

To evaluate the impact of formal credit score on agricultural productivity, the facts had been taken from the economic survey, Pakistani agricultural knowledge, the employed labor survey, and Pakistan's statistical e-book. The variables used in this observe are: Agricultural production in thousands of rupees, credit disbursed from assets in millions of rupees. Agricultural group of employed labor in thousands, take-off of fertilizers in metric tons, tractor production in numbers, general cultivation area in millions

of hectares, inflation index measured by the gross domestic product, deflator, water availability and wide variety of tubular wells

Model specifications

To study the effect of credit score on agricultural productiveness, the specified model

$$LNAGOP = \alpha0 + \alpha1\ LNCDBA + \alpha2\ LNAGLF + \alpha3\ LNTCA + \alpha4\ LNWAL + \alpha5\ INFI + \mu t \quad (1)$$

Further, we additionally distinct the version for explaining the effect of indirect credit score disbursement on agricultural productiveness as given thru equation (2)

$$LNAGOP = \alpha0 + \alpha1\ LNISD + \alpha2\ LNPES + \alpha3\ LNFTO + \alpha4\ LNNT + \alpha5\ LNPOT + \mu t \quad \ldots\ldots\ldots(2)$$

The study was depends on time series data; consequently we observe time series econometric model. First, let's examine the stationary of the variables usage in the technique of the ADF test, the Johansen Co-integration technique become usage for the estimate. The effects are co integration primarily depend on the Eigen values & the 1st & 2nd equation of the model of Probability ratio are explained in Tables 3, 4.The high Dickey Fuller discuss above shows that the series is not stationary at the level, even with a significance level of 10%.

Table 1. Credit Score Disbursement in Pak

Years	1963-64	1973-74	1983-84	1993-94	2003-04	2012-13
Total credit (Millions Rs)	134.44	308.76	6086.24	153.40.	5845.27	293850.99

Table 2. Results of ADF Test for Unit Root

ADF test at Level		**ADF (1st Difference)**		**Integration**
Without trend	With Trend & intercept	Without Trend	With Trend & intercept	
0.3967	-2.325	-4.567	-4.571	I(1)
-0.576	-1.856	-3.938	-3.904	I(1)
-0.616	-2.369	-5.885	-6.034	I(1)
-1.393	-3.472	-4.308	-4.264	I(1)
-3.227	-2.868	-4.409	-5.645	I(1)
-0.582	-2.249	-3.258	-3.242	I(1)
-0.832	-2.846	-8.959	-9.166	I(1)
-1.817	-2.625	-5.853	-5.773	I(1)
-2.232	-0.506	-5.298	-7.023	I(1)
-2.365	-2.253	-4.554	-4.903	I(1)
4.144	1.5902	-4.271	-5.614	I(1)

Empirical effects showed that the relationship of co-integration among agricultural productiveness and long & short term credit score disbursement. Johansen's co-integration technique is an appropriate approach due to all variables are order one co-integrants. Similarity, the vector regression depends on Schwarz Bayesian Criterion and Akaike Information Criterion with optimal lengths of 1 &2 is usage for short-run, Johansen stochastic explains the co-integration among variables. The results of the indirect& direct models are shows below. Table 3 discusses the co-integration vectors. The probability test two integrating vectors with a significance level of 5 percent were detected. The probability test

investigates that 1 co-integration equation was found between credit disbursement and agricultural productivity with a significance level of 5 percent

4. Results and Discussion

The study provides in long and short run. We analysis the effects of credit score disbursement in Tables 5 & 6. The effects of indirect credit score disbursement on agricultural productiveness is discuss in Tables 7 & 8.

Long run estimates of direct credit disbursement on agricultural productivity

The effects of the long run with the coefficients of α matrix within the co-integration coefficients for equation one are defined in Table four.It is observed that it is showed that the agricultural employed labor force, the cultivated land high prices is significantly separated from the supply of credit and the availability of water. It was also examined that the disbursement of credit and the availability of water are less elastic than the participation of the workforce and the total cultivation area. In addition, it is claimed that a one percent increase in lending to a 0.52 percent increase in productivity. Increasing lending should improve productivity and have a +ive effect on the economic system. The effects are in agreement with Hussain. He analysis a +ive but insignificant relationship among agricultural productivity and agricultural credit for a 1% improve in agricultural productivity in better seed distribution improves via 1.54percent.

Short Run Estimates of Direct Credit Disbursement on Agricultural Productivity

The coefficient rate showed that the 0.018 percent adjustment will take place next year towards a long-term equilibrium. The short & long run, the disbursement of credit score via primary source has a +ive effects on agricultural productiveness. Table 6 investigates that the employed agricultural employed labor force, inflation and total cultivated had a –ively effects on agricultural productiveness with a reversible relationship.

Table 3. Results of the Co Integration of Direct Credit Disbursement

Eigen value	**Ratio**	5% Critical val	1% Critical val	**Hypothesized**
0.865019	176.8611	83.16	104.19	None**
0.751418	84.76688	59.53	66.08	At most 1**
0.472326	34.65542	38.22	54.47	At most 2
0.301104	19.64143	38.69	35.66	At most 3
0.187202	6.744241	14.42	19.05	At most 4
0.007817	0. 282486	4.77	7.66	At most 5

Table 4. Results of the Co Integration of the Indirect Credit Disbursement

Eigen val	**Ratio**	5% Critical val	1% Critical val	**Hypothesized**
0.619568	98.39924	94.16	103.19	None*
0.524564	63.60697	68.53	76.08	At most 1
0.416716	36.84023	47.22	54.47	At most 2
0.219278	17.43335	29.69	35.66	At most 3
0.160374	8.522076	15.42	20.07	At most 4
0.060049	2.229367	3.76	6.66	At most 5

Table 5. Normalized Co Integration Coefficients: One Co Integration Equations

Var	Coefficients	S.E	t-stat
Total Credit Disbursed by Formal Sources	0.051	0.044	1.17
Agriculture Labor Force	1.097	0.564	1.95
Total Cropped Area	6.612**	1.533	4.33
Water availability	0.254	0.907	0.27
Inflation	0.022**	0.003	10.1
C	15.388		

Significant impact compared to the cultivated land and high prices. Credit disbursement & water indicates a +ively effects on agricultural productiveness.

Long run estimates of in-direct credit disbursement on agricultural productivity

The effects of the long run evaluation with the coefficients of α matrix within the integration coefficients for equation two are discuss in Table seven. It provides that the seeds, pesticides and seeds are significant, with the exception of fertilizers and number of tubular wells.The consumption of pesticides, the take-off of fertilizers, the tractors are considered inelastic than a better distribution of the seeds.

Table 6. Error Correction Estimates for the Direct Credit Disbursement Model

Dep Var = DLNAGOP

Var	Coefficient	S.E	t-stat
Constant	0.096	0.034	2.99
D(LNAGOP(-1))	0.203	0.165	1.234
D(LNCDBA(-1))	0.024	0.07	0.329
D(LNAGLF(-1))	-0.317	0.113	-2.816
D(LNTCA(-1))	-0.2768	0.376	-0.738
D(LNWAL(-1))	0.533	0.308	1.746
D(INFI(-1))	-0.0008	0.005	-0.253
ECT(-1)	-0.018	0.043	-0.466
R-squared		0.329	
Adj.R-squared		0.163	
F-Statistic		1.961	
Akaike Information Criteria		-7.31	
Schwarz Criteria		-4.933	

Table 7. Normalized Co Integration Coefficients: One Co Integration Equation

Var	Coefficients	S.E	t-stat
Improved Seed Distribution	0.536**	0.405	2.78
Pesticide Consumption	0.437*	0.23	0.87
Fertilizer Take Off	0.483	0.329	0.47
Number of Tube-wells	0.207	0.374	0. 45
Production of Tractors	- 0.556**	0.207	-1.67

Table 8. Error Correction Estimates for the Disbursement of Indirect Credit

Dependent Variable = DLNAGOP			
Var	**Coefficient**	**S.E**	**t-stat**
Constant	0.148	0.039	3.829
D(LNAGOP(-1))	0.225	0.174	1.284
D(LNAGOP(-2))	-0.196	0.166	-1.183
D(LNISD(-1))	0.026	0.048	0.612
D(LNISD(-2))	-0.078	0.049	-1.638
D(LNPES(-1))	0.048	0.033	1.244
D(LNPES(-2))	0.003	0.035	0.089
D(LNFTO(-1))	-0.057	0.119	-0.456
D(LNFTO(-2))	0.304	0.135	2.217
D(LNNT(-1))	-0.292	0.215	-1.366
D(LNNT(-2))	-0.516	0.204	-2.543
D(LNPOT(-1))	0.038	0.039	1.015
D(LNPOT(-2))	0.031	0.039	0.789
ECT(-1)	-0.049*	0.025	-2.067
R-squared	0.62		
Adj.R-squared	0.38		
F-Statistic	2.60		
Akaike Information Criteria	-8.1463		
Schwarz Criteria	-4.1468		

Short run estimates of in-direct credit disbursement on agricultural productivity

In this model of indirect credit disbursement suggests the negative sign. For example the convert from short to long run. The values of the short run evaluation are proven in Table 8. The rate of adjustment coefficient discuss that the % conversion of 0.50 will take place to each year towards the long run.ECT-1 is -ively and significant. The effects of the short-term evaluate investigate that fertilizers and pipe wells indicate a negatively relationship.

5. Conclusion

In conclusion, in the long term, the agricultural workforce employed, the total area cultivated the availability of water and Inflation affects agricultural productivity in a positive and significant way, while the supply of credit and the availability of water are insignificant. Likewise, in the long-term analysis of the indirect model, a better distribution of seeds, the availability of pesticides, the removal of fertilizers and the number of effects of tube well positively, while the production of the tractor has a negative impact. From this analysis it emerged that the disbursement of credit through various formal sources has a positive but insignificant institutional impact on agricultural productivity. The impact of institutional credit has been found to show a discrepancy worldwide. It has been observed that the formal disbursement of credit score across many sectors is the essential element for significant agricultural productiveness. Depend on the consequences of this study, the adoption of a whole and integrated device for the availability of credit may be suggested that in order to high productivity in the agricultural region. In the current state, of conventional and Islamic banking situation can play a critical role on this. New and better seed types are essential for suitable production and this has also been discovered within the outcomes. Therefore, the availability of credit via seed ought to be recommended.

6. Recommendations

The Pakistani agricultural sector still suffers from low productivity, costly financial support for farmers, inefficient market structure and inadequate research. Therefore, in order to develop the agricultural sector and increase agricultural efficiency, it was recommended to improve the accessibility of small marginal farmers to formal agricultural credit. Based on the findings, it was also suggested that the livestock loan be increased. Therefore, providing more credit for livestock would certainly improve farmers' incomes and ultimately reduce poverty.

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