



Performance of Agriculture Sector in Foreign Trade of Pakistan

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Abstract *The vigorous and dynamic expansion and technical progression of the agriculture productivity pave the way to considerable achievements in providing raw materials to the industrial sector and fulfilling domestic demand. The agriculture sector has an imperative role in poverty reduction, growth, increased employment opportunities and increasing foreign exchange reserves through exportable agricultural products. In short, agriculture is the backbone of economic stability and development in the country. This study is an attempt to investigate the performance of the agriculture sector and its impact on Pakistan's foreign trade. The findings of the study revealed the affirmative and noteworthy role of the agriculture sector in the foreign trade of Pakistan during 1980-2017. The policymakers and government of Pakistan should encourage private and public investors for agriculture investment to enhance the production and agricultural exports.*

Key Words: Agriculture Sector, Foreign Trade, ARDL Approach.

JEL Classification: Q17, H27

Introduction

Agriculture, one of the key sectors of the economy of Pakistan, is contributing enough towards economic growth as the population in the country is indirectly and directly dependent upon the agriculture sector. The agriculture sector is contributing a lot to the economy in terms of the employed labor force and foreign exchange earnings. Enhanced standard of living, facilitated education, and improved hygiene can be attained through uplifting employments and thus stimulates per capita income and GDP of the country. Further agriculture sector contributes to the food provisions of citizens; thus, policymakers, planners, and researchers place importance on the role of agriculture sector for the economy (Zaheer et al., 2013). Pakistan is a typical agricultural economy which exports mostly agricultural raw goods. In 1951 about ninety-three percent of total export earnings was contributed by primary goods, however, the modifications and transformation in industrialization policies at the end of 1950s reduced it to seventy-seven percent and since then an average share of twenty percent has been recorded from primary products' share in total export earnings (Malik, 2007). The total contribution to GDP from agriculture sector has also reduced to 22.1% in 2017 from 26.5% in 1980 (Source: Economic Survey of Pakistan, 2016-17). The country has moved from

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agriculture towards more services and the manufacturing sector economy as the contribution of services sector increased from 40% to 53% and manufacturing sector has decreased from 14.3 to 12.1% in the study period.

The agriculture sector in Pakistan remained very much involved in determining the overall GDP of the country. The share of agriculture raw material exports as a percent of merchandise exports of the country have reduced from 20.5% in 1980 to 0.9% in 2017 while the imports of agriculture raw materials on average fluctuates around 4 to 5% from 1980 to 2017 (Source: Economic Survey of Pakistan, 2016-17). The trade deficit increased by 0.9 on average in the 1980s with a 4.5% average growth rate of imports and 8.5% average growth rate of exports. The share of primary products to exports decreased from previously forty-four percent in 1980-81 to twenty percent in 1989-90. Whereas in the same period, the share of manufactured goods in total export earnings raised to fifty-nine percent from the previous ratio of forty-five percent. Similarly, the structure of imports also changed, the share of consumer merchandise reduced from sixty-five percent in the start of 1980s to sixty percent by the ending of 1989 ([Akhtar, 1999](#)). A slight improvement from 0.13% in 1980 to 0.15% in 1997 has been observed in Pakistan's share to overall worldwide exports, though; decline from 0.25% to 0.22% has been recorded for the same time period in Pakistan's share in overall global imports. In 1990s, the increase in annual average export was 5.6% whereas imports increased by 3.2% shaping an average trade deficit of -0.6%. The share of agricultural goods was declining and recorded as nineteen percent of total exports which reduced further to twelve percent in 1999-2000 ([Bashir, 2003](#)). Likewise, the share of manufactured goods in overall exports rose to seventy-three percent in 1999-2000 from fifty-seven percent in 1990-91. Though, there was a rising trend in the share of raw materials for consumer goods and industrial inputs in overall imports of Pakistan, rising to sixty-eight percent in 1999-2000 from sixty percent in 1990-91, revealing the speed of development process by raise in industrial raw material imports to develop the industrialization progression ([Khanet al., 2005](#)).

In the 2000's, the yearly average growth rate observed was 9.9% in exports and 13.7% in imports, determining about 60% average rise of trade deficit. In 2009-10 total export earnings were recorded around \$15.9 billion, as compared to \$14.7 billion in the previous year, showing a better export growth rate of eight percent as compared to the negative growth rate of three percent in preceding year. Conversely, in 2009-2010 imports decreased by 2.8% relative to the prior year's growth ([Faridi, 2012](#)). Major determinants behind the decrease in import bills were lower international prices, low local demand, an increase in production of cotton crops and exchange rate depreciation. Therefore, in the history of Pakistan trade structure and design revealed modifications and transformations to manufactured merchandise from primary goods that are mandatory for the expansion of a struggling country though still, the majority of these manufactured merchandises are largely agricultural goods mostly cotton ([Anwar et al., 2010](#)).

History is evident that since years, agricultural goods have been the major exportable of Pakistan. However, agriculture goods were going to rising demand from the local textile industry which reduced export of raw cotton in the 1960s. In this era great developments and modifications have been witnessed both in agriculture and industry. But in 1971 the drastic alteration in nature and pattern of trade occurred due to the separation of East Pakistan. Because of increased local demand, some

merchandise lost exportable significance such as raw wools, hides and skins and Jute, whereas tea has totally vanished from the list of export items.

The share of five types of exports was accounted for about 79.8% of total exports in 2003-04 ([Mahmood et al., 2010](#)). The percentage share of these export goods was as sports goods 2.6%, synthetic textile 4.2%, rice 5.2%, leather 5.3%, and followed by cotton and cotton products alone contributing about 62.5%. This unremitting focus of exports within a few categories of goods effects stability in export earnings all through Pakistan's economic history. Almost all of these export goods are agriculture-based and are seriously influenced by climatic and weather situations. Therefore, unsure risk or cut just in cotton crop only can critically upset total export earnings, which is evident from the history ([Malik, 2010](#)).

Despite its vital significance to overall development, economic growth, exports of primary merchandise, employment creation, provision and food security to the citizens, the growth and investment in agriculture sector of Pakistan is seen to be at decline from few decades. Thus, this dissertation targets to investigate empirically the contribution of the agriculture sector in foreign trade of Pakistan. Moreover, this piece of work not only adds to relevant literature on the role of agriculture sector of Pakistan as a key factor of the foreign trade but also discover the correlation between overall foreign trade of Pakistan, imports and the agriculture sector exports.

Review of the Literature

Though there are numerous studies done on agriculture, the importance of this sector is increasing with time in the developing countries especially that are reliantly dependent on this sector. The agriculture sector keeps a dominant place in the growth and trade of developing countries. Pakistan is consistently confronting tenacious shortage in foreign trade and has risen year to year, so this investigation emphasizes the performance of the primary sector in the foreign trade of Pakistan.

[Akhtar \(1999\)](#) attempted to scrutinize the effect of trade liberalization in the agriculture sector of Pakistan. The study found that world price and liberalization policies of trade significantly affect the productivity and contribution of agriculture sector commodities applying welfare analysis. The study recommends that to raise agriculture exports, Pakistan needs to bring an improvement in the quality and quantity of agricultural products, successfully compete for the products of other developing countries, increase access to foreign markets and utilize advanced technology in agriculture sector. [Kristinek and Anderson \(2002\)](#) explored the importance of the exchange rate in exports and imports of agriculture products for North American countries and found that the trade of agriculture sector goods is very sensitive to the exchange rate. [Robbins and Ferris \(2003\)](#) investigated that globalization on agriculture sector of Central and East African Countries plays an impressive role and concluded that liberalization policies of trade regarding agriculture sector of Central and East African counties had played an influential role in the development and attracting foreign trade and income of the studied economies. The study also concluded that though there was an increase in competition for the agricultural products of these countries, however, the overall effect on the agriculture sector in the studied countries remained satisfactory. Moreover, Ahmad et. al. (2006) studied the formulation and adaptation of different domestic policies related to trade of agricultural sector and found a

considerable effect of domestic policies on agriculture sector policies regarding trade liberalization.

Analyzing the determinants of agriculture-exports of Turkey and the European Union's countries ([Erden & Naziliglu, 2008](#)) found that agriculture-exports of Turkey emphatically related to European countries during 1996-2004. Further, the imports of agriculture-products have a successive correlation with the Turkish agriculture sector. Furthermore, ([Fabiosa, 2008](#)) found that free trade has a foremost effect on the agriculture sector of developing countries around the world. The change of world prices leads to an affirmative effect on agriculture-exports and agri-imports of developing countries. Further, world income, world prices and world income distribution had also optimistic and considerable effect on agriculture sector products. Determining the agri-exports for Egypt during 1994-2008 ([Hatab et al., 2010](#)) found an impressive contribution utilizing the Gravity Model of trade. Moreover, in developing countries, [Josling \(2010\)](#) attempted to investigate the role of agriculture products trade and found that world price and trade policies had a robust effect on agriculture sector products of developing countries. Moreover, variation in prices, market imperfection, climate change, frequent changes in consumer preferences and enhanced agriculture production are greater challenges for developing countries.

The liberalization policies adopted in Pakistan have robust outcomes on the trade performance of agriculture during 1971-2008, that trade liberalization and international trade policies had a significant effect on the agriculture sector exports. Further, world trade and world demand for agricultural products had a positive effect on agriculture exports of Pakistan ([Anwar et al., 2010](#)). [Malik \(2010\)](#) empirically investigated and found that agriculture sector performance was quite satisfactory concerning economic reforms and trade liberalization applying the error correction model (ECM) and revealed that domestic policies had an influential effect on agriculture sector exports of Pakistan. Further, the long-run equilibrium exists among agri-exports, world income, trade openness, diversification and agriculture sector competitiveness.

Based on above-cited literature, a need for further research is felt in the field of agriculture and its role in determining the trade of the country. Therefore, the current study investigates the role of agriculture-exports and agriculture-imports in the foreign trade of Pakistan.

Econometric Model and Data Description

To analyze the importance of agriculture sector, trade this study emphasized the development of a model for the growth of the agriculture sector and foreign trade in Pakistan. In developing the model for the analysis, the main theme is adopted from previous models in the same field of ([Ju, et al., 2020](#); [Wacziarg and Welch, 2008](#); and [Santos-Paulino and Thirlwall, 2004](#)).

The agricultural sector vitally added to trade and growth of Pakistan economy since independence. Besides that, this sector also has a considerable contribution to employment, reduction in poverty, development, food security and wellbeing, especially in rural areas. Knowing the prominence of agriculture sector, this investigation stabs to analyze the performance of agri-sector in the trade of Pakistan assuming "FT" foreign trade as the dependent variable and agri-exports "XAgri", agri-imports "MAGri", "ER"

as exchange rate, “BOT” the balance of trade and “TOT” terms of trade the regressor variables can express as

$$F.T = f(X_{Agri}, M_{Agri}, ER, BOT, TOT) \dots\dots\dots (2)$$

Pakistan being a conventional economy is very much dependent on the agriculture sector. Despite great importance and predominant contributor, the agri-sector regardless of incredible potential and land richness did not succeed in making their place in international markets. Despite the many obstacles still, the exports of agri-products keep good place in foreign trade. However, for the improvement of the productivity of this sector, there are also needs of a lot of products, materials and necessary items plus equipment that are imported from other countries. The country relies upon import of farming-related things from abroad because of its inadequacy and deficiency in utilizing the full benefits. Some cultivating and farming items are generally efficient and can be effectively imported from abroad rather than domestic creation that are commonly productive. Being an involvement of trade, the role of the exchange rate becomes more impressive and can't be ignored, so the inclusion of exchange rate about exports and imports of agriculture products that possibly affect Pakistan's foreign trade is obligatory and is regressed.

Similarly, the study included the variable “TOT” as a factor of terms of exchange because it is the suitable best comparison of exports to imports and the extent of the degree to the prices of exportable and importable products. Hence, the country faced and still hardly years due to chronic deficit the trade of Pakistan remained inconvenient. For this reason, the current study attempted to analyse the empirical impact of balance and terms of trade with reference to agriculture sector. In view of the above, concerning exports and imports of agriculture product to find out its impact based on the above discussion and theoretical justification of the variable's inclusion, the study converted the model into the following econometric form:

$$FT = \beta_0 + \beta_1 X_{agri} + \beta_2 M_{agri} + \beta_3 ER + \beta_4 BOT + \beta_5 TOT + \eta_t \dots\dots\dots (3)$$

The study for the sake of simplicity in estimation converted the model in the double-log model to get the respective elasticities of the coefficients as follows:

$$LnFT_t = \beta_0 + \beta_1 LnX_{Agri} + \beta_2 LnM_{Agri} + \beta_3 LnER_t + \beta_4 LnTOT_t + \beta_5 BOT_t + \mu_t \dots\dots\dots (4)$$

The time-series data from 1980-2017 been analyzed to examine the performance of the agriculture sector in the trade of Pakistan. The study collected the required data from various sources including SBP, Zarai Taraqati Bank Pakistan (ZTBL), Ministry of Trade and Commerce Pakistan, and various issues of the Economic Survey of Pakistan. For the achievement of the set objectives, this research utilized the data for stationarity properties to detect if the data is having any unit root or not. After that, the study adopted appropriate cointegration tests to explore the long-run cointegration, cointegration proper method of estimation i.e. Autoregressive Distributed Lagged (ARDL) model is used to simultaneously estimate short/long-run relationship of the variables. The study carried out all these steps as under.

Analysis, Results and Explanations

Unit Root Analysis

Data used in this study is examined for unit root and spurious relation through the ADF test.

Table 1. Unit Root Test Results

	I(0)	I(1)	Critical Value (5%)
Foreign Trade	-1.638804	-3.458877	-2.951125
Agri- exports	-3.792049	-5.593836	-2.951125
Agri-imports	-1.957632	-3.453213	-2.951125
Exchange Rate	-1.629135	-3.871635	-2.951125
Terms of Trade	-3.447848	-4.383145	-2.951125
Balance of Trade	-3.103501	-4.978477	-2.951125

The results show the rejection of null hypothesis of agriculture exports, TOT and BOT at I (0) and agriculture-imports, exchange rate and foreign trade have at least one unit root and they become stationary after first differencing I(1). During the mixed integration order, the suggested technique of cointegration and regression is Auto-Regressive Distributed Lag (ARDL) model (Pesaran, et. al., 2001).

Co-integration and Bounds Analysis

Based on the outcome of stationarity analysis, the study adopted the ARDL bounds test of cointegration and estimated the ARDL bounds results under the following ARDL model.

$$\Delta \ln FT = \beta_0 + \sum_{i=1}^n \beta_1 \Delta \ln FT_{t-i} + \sum_{i=1}^n \beta_2 \Delta \ln X_{t-i} + \sum_{i=1}^n \beta_3 \Delta \ln M_{t-i} + \sum_{i=1}^n \beta_4 \Delta \ln ER_{t-i} + \sum_{i=1}^n \beta_5 \Delta \ln TOT_{t-i} + \sum_{i=1}^n \beta_6 \Delta \ln BOT_{t-i} + \alpha_1 \Delta \ln FT_{t-i} + \alpha_2 \ln X_{t-i} + \alpha_3 \ln Mag_{t-i} + \alpha_4 \ln ER_{t-i} + \alpha_5 \ln TOT_{t-i} + \alpha_6 \ln BOT_{t-i} + \epsilon_t \dots \dots \dots (5)$$

Where the drift component is shown by β_0 and white noise error term by ϵ_t . Where $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5,$ and β_6 shows the dynamics of error correction mechanism and alphas (α) shows the long-run relationship. The confirmation long-run relation is ensued from co-integration and bounds when the critical tabulated bounds values is less than F-stat. value either at 5% or 1% (Pesaran, et. al., 2001). From the below analysis the value of the bound indicates the presence of long-run association and rejects the null hypothesis of no cointegration.

Table 2. Bounds Analysis Test

Bounds Test Value	Critical Bounds value (5%)	
	Bound I(0)	Bound I(1)
F-stat.	4.953923*	2.45 3.61

The presence of long-run cointegration is evidence that these variables are related to each other in short and long-run, thus, the study opts for ARDL model to simultaneously reconnaissance the performance of agriculture-exports and agricultural-imports in the foreign trade of Pakistan assuming long-run estimates as follows:

$$\ln FT = \gamma_0 + \gamma_1 \ln X_t + \gamma_2 \ln M_t + \gamma_3 \ln ER_t + \gamma_4 \ln TOT_t + \gamma_5 \ln BOT_t + \mu_t \dots (6)$$

Where

$$\gamma_0 = \frac{\alpha_0}{1-\sum \alpha_{1i}}, \gamma_1 = \frac{\alpha_{2i}}{1-\sum \alpha_{1i}}, \gamma_2 = \frac{\alpha_{3i}}{1-\sum \alpha_{1i}}, \gamma_3 = \frac{\alpha_{4i}}{1-\sum \alpha_{1i}}, \gamma_4 = \frac{\alpha_{5i}}{1-\sum \alpha_{1i}}, \gamma_5 = \frac{\alpha_{6i}}{1-\sum \alpha_{1i}}$$

The study applied ARDL to regress and find the long-run behavior of especially agri-exports and agri-imports. This study selected the ARDL (1,0,1,1,1,0,1) model under the Akaike Information Criteria (AIC) during regression analysis. The results depicted in the table (3) indicate that a 1% increase in exports of agricultural goods may lead to an increase of 0.36% in foreign trade. The share of agricultural exports in overall Pakistan exports was 20% in 2014-15 and that was nineteen percent in 2013-14 (source: Economic survey). The empirical result of agricultural-exports is consistent with the studies of ([Bashir, 2003](#); Nadeem, 2007; [Anwar, 2010](#); [Mahmood, 2010](#); and [Malik, 2010](#)). The results further reveal that agricultural-imports are positive and highly significant indicating that it may lead to an affirmative change of about 0.57% is consistent with the study of Sharif et al. (2010) and [Faridi \(2012\)](#).

The empirical findings of the study further revealed a weak considerable significant effect of the exchange rate with a negative sign as expected and evident of may probably change of 0.15% in foreign trade and is identical to the studies of [Kristinek and Anderson \(2002\)](#), [Kemal \(2005\)](#), Xafa (2007) and [Zaheer \(2013\)](#). The significant and noteworthy effect of TOT is also found on the foreign trade via agriculture sector that reveals that it may change the direction of trade by 0.26%. This outcome reveals that the foreign trade is less elastic to changes in terms of trade in the case of Pakistan as the country's TOT is not that strong in the trade of agriculture products.

Table 3. Long Form Coefficients Results

Variables	Estimator	Sd. Error	t-Stat	Pob.
Ln(X _{agri})	0.369241	0.155918	2.368172	0.0300
Ln(M _{agri})	0.573708	0.159705	3.592285	0.0022
Ln (BOT)	0.158062	0.071470	2.211576	0.0346
Ln (TOT)	0.262469	0.136303	1.925616	0.0838
Ln (ER)	-0.158275	0.085818	-1.844297	0.0953
C	0.249480	0.202283	1.233318	0.5179
R²	0.860439	D-W stat		2.051265
Ad. R²	0.831863	F-stat. Probability		0.000000

Short Run ARDL Analysis

The findings of the short-run analysis delineate that there is a certain positive effect of agri-exports on the foreign trade of Pakistan. This outcome reveals that exports of agriculture products are significant portion of the total trade of Pakistan and they can lead to an upward push towards foreign trade. The results reveal that if there occurs an increase of 1% in the short-run in agriculture exports, it can increase the overall trade of Pakistan by 0.28% in the short-run. Similarly, imports of agriculture products are also helpful in boosting the foreign trade of the country meaning that a rise of 1% of agriculture-imports may lead to an increase of 0.42% in total trade of Pakistan. This outcome is very much normal in case of Pakistan as the country is playing very high in term of imports which is evident from the negative net export value of the country. In addition, any improvement in the balance of trade can be beneficial for the country in terms of improving the net exports of country BOT mean the balance of exports to imports. Since Pakistan is very low in exports as compared to imports, thus balancing the trade means the country has to increase the exports and opt for export-oriented

policy rather than import protection, which can be very much helpful in boosting the trade.

Table 4. ARDL Short-run Outcomes

Variable	Alpha values	St. Error	t-stat	P.
Ln(FT (-1))	0.761346	0.190632	3.993808	0.0007
Ln(X _{agri})	0.287947	0.158201	1.820143	0.0742
Ln(M _{agri})	0.424806	0.202683	2.095912	0.0425
Ln (BOT)	0.250605	0.071241	3.517693	0.0022
Ln (TOT)	0.170389	0.106354	1.602011	0.3539
Ln (ER)	0.163426	0.069185	2.362127	0.0284
CointEq (-1)	-0.51419	0.213326	-2.241033	0.0320

Last but not the least, in short-run terms of trade does not affect the foreign trade of Pakistan significantly and reveals that improvement in terms of trade in short, has no significant improving impact on the overall trade of the country.

Diagnostic Tests Results

To check the sensitivity, reliability and goodness of fit of the model, the study checked the serial correlation, Heteroskedasticity and Ramsey RESET test to examine the reliability of the findings and results and conveys that the findings are reliable, stable and did not illustrate any chances of misspecification and biasness based on diagnostic tests results.

Table 5. Diagnostic Tests Results

Test	F-Statistics	Probability	Conclusion
Serial Correlation	1.121902	0.2895	No Serial Correlation
Heteroscedasticity	13.97672	0.1891	No Heteroscedasticity
Ramsey RESET Test	0.009782	0.9222	Correct Functional Form

The study further applied residuals CUSUM residuals and CUSUM square to predict the stability of parameters of the model and confirmed the stability of model parameters as depicted in figure (1) and (2).

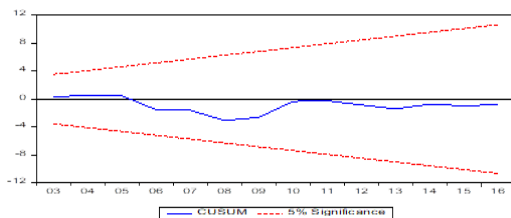


Figure 1: CUSUM Residuals

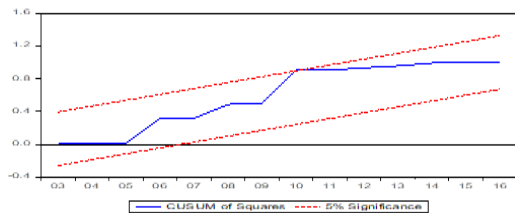


Figure 2: CUSUMSQ Square

Conclusion

The performance of agriculture sector via agriculture-exports, agriculture–import in

determining the trade of Pakistan is utilized and concluded that trade of agriculture commodities including exports and imports exerts a positive impact on foreign trade. This outcome reveals that as agriculture is the major contributing sector of Pakistan, thus, the total foreign trade of the country can be significantly affected by a rise in trade share of agriculture sector. In case of Pakistan, despite high potential of agriculture sector exports, the country has faced decline in the exports of this sector. The main reasons for this decline are low productivity, low quality, inefficient utilization of resources, lack of capital and modern technology, unskilled labor and unavailability of technical experts, and negligible research and innovations expenditures in this sector. Similarly, this sector has faced a severe fall in growth rate due to low attention and decrease of public and private sector investment as well as inefficient government policies.

Moreover, the net exports of Pakistan show negative sign which is not good for the country and trade balance, thus, there is a need to focus on the export-oriented policies to compete in the international market rather than to protect the low-quality domestic production activities. Since the quality of agriculture products of Pakistan is not that much compatible with the other rivals in the field, thus, terms of trade of the country remained weak as compared to the trading partners. Therefore, there is a need to enhance the quality of the agricultural products to make them competitive in the international market, thus, strong terms of trade. The study recommends that the government of Pakistan should subsidize agriculture sector products by providing more incentives, price support, insurance and bonuses, credit availability and farmer supports to enhance the productivity of this sector. Similarly, advanced technology and training to classical farmers as well as the availability of skilled labor be ensured to increase productivity. Further, the decrease in export and import tariffs of agriculture sector and access of Pakistani agriculture products to the foreign market may make this sector more profitable, fruitful and contributing to the growth and trade of Pakistan.

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