DETERMINANTS OF BASMATI EXPORTS FROM PAKISTAN: A PANEL DATA ANALYSIS

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ARTICLE INFO	ABSTRACT
	This paper aims to estimate the impact of different factors of basmati exports from Pakistan to its trading partner. Results are obtained by using the Generalized Method of Moments (GMM) model and panel data methodology with a sample of 22 countries for the period of 2003-2019. To estimate the impact of different variables on basmati exports Generalized Method of Moments (GMM) model is used on the panel dataset. The results revealed that the inflation rate of Pakistan has a negative and significant effect on the export competitiveness of Pakistani basmati. The exchange rate of Pakistan has a positive and significant impact on the basmati export, the population of Pakistan has a negative and significant impact on basmati export. Basmati production in Pakistan also has a significant and negative impact on basmati export. The Gross Domestic Product (GDP) of Pakistan has a significant and positive impact on the basmati export while the GDP of the trading partner has a significant and negative impact on the basmati export. The dummy variable for joint border also has a positive and significant impact on basmati exports of Pakistan.

INTRODUCTION

The agriculture sector is the backbone of Pakistan's economy. It contributes 18.9 percent to the National GDP (Gross Domestic Product), and 43.5 percent to the National labour force (GoP, 2020). Agriculture is the biggest sector of Pakistan's economy in terms of labor participation and as such livelihood of most of the population directly or indirectly relies on it. In terms of potential, the agriculture sector cannot only produce the domestic purpose but also has excessive production for exports, which makes sure food security and helps in earnings of foreign exchange. During FY 2019-2020, the performance of the agriculture sector is better than the previous year, and also its contribution is more than other sectors. The agriculture sector showed persuasive growth of 2.67 percent for the current year, which is comparatively higher than 0.58 percent growth attained during last year. According to an economic survey of Pakistan, it contributes about 19.03 percent of Gross Domestic Product (GDP) during FY 2019-2020. Rice has

much importance in the agricultural sector of Pakistan because it is the main food as well as one of the major cash crops. Rice is the second main staple food crop after wheat and the second major exportable crop after cotton. It contributes 3.1 percent in the value addition of agriculture while 0.6 percent in the GDP of Pakistan. Rice cropping area is 3034 thousand hectares with an improvement of 8.0 percent as compared to last year which was 2810 thousand hectares. The production of rice was 7410 thousand tons in 2020 against 7202 thousand tons in previous year with a growth rate of 2.9 percent. During FY2019-2020, 4166 thousand tons' rice was exported to its trading partner, and in return, Pakistan received 343911 million rupees (GoP, 2020).

Basmati rice is the primary type of rice which is cultivated in (central and southern Punjab) Pakistan. Basmati rice is famous in the country due to its excellent cooking quality and good marketing value at national and international levels Pakistani fine rice well-known as

basmati is very famous worldwide. It enjoys a monopoly in the global market, due to its strong aroma, taste and texture, quality characteristics, and grain elongation on cooking. The world is ready to pay a premium for this. It supports the case for the crop to be protected as Geographical Indication (GI) and exports to be enhanced. Basmati has traditionally been an export crop in Pakistan. During the first half of the fiscal year 2019-2020 Pakistan earned $313.017 million by exporting about 343,885 metric tons of basmati rice, according to the Pakistan Bureau of Statistics. During FY 2019-2020,

890 thousand tons of rice were exported to its trading partner, and in return, Pakistan received 125133 million rupees (AMIS, 2020).

Table 1 shows the countries with overall major importing markets and Pakistan are earned the highest export values from them during the year of 2019. Major ten basmati exports markets are given in Table 2. Panel data about 22 countries were selected on the basis of the exported value of basmati rice from Pakistan which is the major source of earning from basmati export as export values in 000 USD.

Table 1. Major markets for Pakistani exports.

Sr. No	Country	Total export value (000 USD) in 2019
1	United States of America	4042271
2	China	2042893
3	United Kingdom	1682328
4	Germany	1344826
5	Afghanistan	1183592
6	United Arab Emirates	1179059
7	Netherlands	1058341
8	Spain	949000
9	Italy	810401
10	Bangladesh	793034

Source: International Trade Centre

Table 2. Major markets for Pakistani basmati exports.

Sr. No	Country	Basmati export value (000 USD) in 2019
1	United Arab Emirates	195047
2	Saudi Arabia	73337
3	Oman	49150
4	Yemen	44240
5	China	33811
6	United Kingdom	33504
7	Kazakhstan	29251
8	United States of America	28830
9	Kenya	24217
10	Italy	21263

Source: International Trade Centre

Bader (2006) examined the Import Intensity of Exports for Pakistan. The study provides empirical evidence that imports of intermediate and capital goods are important inputs in the export production of the country. The study by using the Ordinary Least Square method empirically examines the semi-reduced export equation for the years 1973-2005. The study concludes that in the case of Pakistan, there is a long-run relationship between export and imports of intermediate and capital goods. Ahmad and Garcia (2012) have employed the augmented gravity model to investigate the effects of Pakistan's milled rice exports to 92 markets during 1991-2010. The study analyzed Pakistan's real GDP and export prices by

regressing the Hausman-Taylor estimation technique. The study indicates that Real GDP in import markets has a significant positive effect on demand. The empirical results also indicate that Pakistan's real GDP, export prices, and exchange rate also affect export supply. The empirical findings also suggest that distance negatively affects exports. Javed and Ghafoor (2013) explored the main factors which manipulating the exports from Pakistan to the United Kingdom. Primary data has been taken for study and descriptive statistics, regression analyses were performed. The results showed that insignificant variables were purchase price, sale price, age, and significant variables: marketing cost, freight

charges, and education. The conclusion recommends that appropriate policies and comprehensive supervision were essential to enhance basmati rice export in Pakistan.

Ashfaq *et al*. (2013) expressed the qualities of the basmati rice and also discuss the diseases which badly impact on decreasing their production. Different varieties of rice have been discussed. To increase the quantity of basmati rice new modern techniques should be applied. Basmati rice possesses high-quality nutrients, minerals, phosphorus and energy caloric. This research is helpful for scientists as well as for the rice farmers for obtaining growth in varieties of basmati rice. Abdullah *et al*. (2015) concluded that rice is the primary source for boosting Pakistan's economy because it can increase foreign exchange earnings. The major rice exporters in Pakistan got the highest position in competitiveness. But it needs to maintain it by adopting new techniques and strategies to increase the production of rice. The data of ten countries have been collected for the year 2000 to 2011. The study used RCA to observe the competitive advantage of the country. To check the relative export gain, Xij (total export rice has been used. The country has a comparative advantage if the value of RCAij (relative comparative advantage) was bigger than zero.

Jafar *et al*. (2015) described that as we all know, Pakistan is an agrarian economy and a major part of the revenue was generated from agriculture export goods, i.e., a major source of foreign exchange earnings is rice export. There was a loop in policies because of gaps between technology and skilled labour and other constitutional regulatory factors. The study highlighted that in the previous three-year plan of STPF (Strategic Trade Policy Framework) the major highlighted area was an improvement in trade sector efficiency. Because of financial crises, instability, deficiency of research and development rice production has been decreasing, which had a negative impact, i.e., loss of 30 percent share in the Gulf market. Therefore, the basic and most important need is to reforms and innovation in strategies for welfare and development of society to maximize the revenue from exports.

Yousaf *et al*. (2016) examined the factors that affect the supply of acreage basmati in the case of Pakistan for the period from 1975-76 to 2012-13. The study of agriculture supply response to prices is an important agenda for future research. The study empirically examines the own and cross-price elasticity that indicates a change in the price of a single crop affects the allocation of land to that product and land allocation to other crops also depending upon their competitive relationship. The results indicate that in Pakistan's case,

the acreage under basmati rice is significantly affected by its price and the price of ire rice. Shahzadi *et al*. (2018) concluded that Rice is a major crop of agriculture that plays a vital and significant role on the economic growth of a country. Basmati rice is well known for its quality and taste. If the production of rice increases the export volume also on the higher side. Countries like Canada, Germany, Yemen, Saudi Arabia, Oman, UAE, U.K, Belgium, Iran, Iraq, USA, etc. are importing basmati rice from Pakistan. Irshad *et al*. (2018) applied panel gravity approach and methodology has been used PPML. The data has been taken from 144 countries for the period of 2003 to 2016. The finding showed that in the international market, Pakistan has a huge advantage for exporting rice due to its unique quality. Pakistan has the capability to increase exporting volume which is helpful for improving foreign exchange earnings and reduce the trade deficit.

Kiani *et al*. (2018) examined the determinants of agricultural exports in case of Pakistan for the period from 1984 to 2014. By using the gravity model and random effect model the study discovers the components that affect the rice and cotton trade in Pakistan. The empirical results indicate that Pakistani exports are positively affected by the production and GDP of partner countries. The empirical findings also suggest that distance has a negative impact on exports and GDP. Javed *et al*. (2020) examined the influence of different elements on basmati export and execute Pakistani basmati export to international markets. Panel data has been used for the year 2003 to 2016. Park's Feasible Generalized Least Square indicates that exchange rate and inflation negatively affect Basmati export. On the other hand, trading partner exchange rate and inflation positively and significantly influence Basmati export. The policy suggests that Pakistan can increase export volume by decreasing the inflation rate and gave subsidies on inputs for rice cultivators. Dummy variables of joint border and Muslim country were used that significantly and positively affected basmati exports.

The purpose of this study is to enhance the export of the basmati from Pakistan to its trading partner. First, basmati export is affected by relations with the neighbouring countries as well rest of the Muslim worlds. Good relations with the neighbouring countries as well as the Muslim countries help to enhance the basmati export from Pakistan. Second, expand trade with big economy markets United States of America, Saudi Arabia, China, Oman and the United Kingdom. Third, the domestic producer of basmati rice plays a vital role in the export of basmati rice from Pakistan because Pakistani basmati rice is famous in the world for its good cooking

qualities. Article to the farmer as they produced at the lowest cost and in return earned handsome amount by exporting it.

METHODOLOGY

To examine the determinants of basmati exports from Pakistan to its trading partner, secondary data were collected from the year 2003 to 2019. Data of gross domestic product of Pakistan and gross domestic product of trading partner, the population of Pakistan and population of trading partner, the exchange rate of Pakistan and exchange rate of trading partner and inflation of Pakistan were taken from Word Bank. Data on basmati production of Pakistan was taken from the Pakistan Bureau of Statistics. Data of dependent variable also taken from the International Trade Centre. Panel data set regarding 22 selected trading partners of Pakistan were used in the analysis. These countries are overall major importers of Pakistan as well as major markets for Pakistani basmati. United Arab Emirates, Kenya, Kazakhstan, Afghanistan, and Yemen have missing values in the data of exchange rate therefore, these countries were excluded from the panel data set. Although the United Arab Emirates has an excellent share in Pakistan earnings. For this purpose of estimation of the impact of different factors on basmati exports of Pakistan to its trading partners, the following model was devised.

$$Ln(BEXPRT_{ij}) = \beta_0 + \beta_1(BPRO_i) + \beta_2(logGDP_i) + \beta_3(logGDP_j) + \beta_4(logPOP_i) + \beta_5(logPOP_j) \beta_6(EXCH_i) + \beta_7(EXCH_j) + \beta_8(INF_i) + \beta_9 dummy1 + \beta_{10} dummy2 \quad (1)$$

Where, i represents Pakistan and j represents the trading partner of Pakistan. Basmati export from Pakistan to its trading partner taken in the model as a dependent variable. To avoid the problem of heteroscedasticity, heterogeneity and autocorrelation, the natural logarithm of the dependent variable is used in the model. Log of GDP of Pakistan and trading partner and log of the population of Pakistan and trading partner is used in the model because without taking their log values of β are large which creates problem to understand the results. The second lag of the dependent variable and the first lag of each independent variable except dummies is taken as an instrumental variable in the model. Table 3 shows the definitions of the variables with their units that is used in the analysis. Basmati export from Pakistan to its trading partner is taken as a dependent variable while rest all variables are independent in the model. Two dummy variables were used in the model. The variable of dummy 1 for joint border and dummy 2 for Muslim countries are included in the model.

Table 3. Definitions of variables.

Variables	Definition
BEXPRTij	Basmati export from Pakistan to its trading partner (000 USD)
BPROi	Annual production of basmati in Pakistan (000 Tons)
GDPi	Gross Domestic Product of Pakistan (Million USD)
GDPj	Gross Domestic Product of its trading partner (Million USD)
POPi	Population of Pakistan (Individual)
POPj	Population of its trading partner (Individual)
EXCHi	Exchange rate of Pakistan
EXCHj	Exchange rate of its trading partner
INFi	Annual rate of inflation in Pakistan
DUMMY1	Joint border =1 otherwise= 0
DUMMY2	Muslim =1, Non-Muslim=0

RESULTS AND DISCUSSION

In order to examine the determinants of basmati exports from Pakistan to its trading partners, a Generalized Method of Moments (GMM) model was applied, by following Hillier *et al.* (2011). This study used a GMM approach for several reasons. First, the GMM approach is consistent with the panel data structure and it is efficient when fewer time periods (T equals 17) and more cross-sections (N equals 22) (Asongu *et al.*, 2018). Second, it was used to control for the endogeneity problem (Hillier *et al.*, 2011). Both heteroscedasticity and auto-correlation problems can be addressed by GMM

estimations (David *et al.*, 2006). Heteroscedasticity may arise because different countries in the sample have different characteristics. Thus the residuals are unlikely to be constant across observations. Using the lag of dependent variables may create autocorrelation problems. Table 5 represents the panel unit root tests based on augmented dickey-fuller (ADF) were chosen as it allows unbalanced panel data. The null hypothesis of the Fisher-type test is that panels contain unit roots (i.e., the variables are non-stationary). The dependent variable basmati export from Pakistan to its trading partner, the exchange rate of trading partner, and exchange rate of

Pakistan are stationary at 1st difference. Basmati production in Pakistan gross domestic product of Pakistan, gross domestic product of trading partner, population of Pakistan population of trading partner and inflation rate of Pakistan are stationary at level. Table 4 shows the summary statistics of the variables.

Table 4. Summary statistics of variables used in the model.

Variables	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
BEXRTIJ	13401.29	6697	116704	2	18339.36	374
BPROI	6075.371	6160.4	7449.8	4478.5	940.4976	374
DUMMY1	0.045455	0	1	0	0.208578	374
DUMMY2	0.272727	0	1	0	0.445958	374
EXCHI	88.30414	86.34338	150.0363	57.752	25.07954	374
EXCHJ	62.80583	1.380384	1276.93	0.3845	231.1467	374
GDPI	204984.7	213587.4	314567.5	91760.54	68644.86	374
GDPJ	2000295	771626.1	21374419	18881.77	3646252	374
POPI	1.84E+08	1.83E+08	2.17E+08	1.53E+08	19448220	374
POPJ	1.15E+08	40196108	1.40E+09	681788	2.76E+08	374

Table 5. Panel unit root test.

Variables	level	First difference
LN-BEXPRTij	-	229.877**
BPROi	65.7365**	-
LOGGDPi	121.034**	-
LOGGDPj	111.804**	-
LOGPOPi	80.0936**	-
LOGPOPj	93.2237**	-
EXCHi	-	103.821**
EXCHj	-	118.566**
INFi	73.4621**	

Note: All panel unit root tests were executed for all variables with individual intercept except LOGPOPi and EXCHi, these were performed with individual intercept and trend.

*Level of significant: *<0.10, **<0.05, ***<0.01.*

Table 6 presents the empirical results of the GMM estimation. Basmati production (BPROI) in Pakistan has a negative and significant impact on basmati export from Pakistan. The negative relation shows that if one unit change in basmati production in Pakistan it will decrease .00026 percent in basmati export from Pakistan. Basmati production of Pakistan has negative relation with basmati export from Pakistan to its trading partner because exporters did not agree to export basmati rice because they did not receive the good price at the international level. Therefore, they get good prices at the domestic level and are sold out in the country. Dummy 1 is a joint border, results show a negative and insignificant impact on basmati export. With neighbor's relation is not good like India so ultimately its effect our basmati export to neighbour's countries. Dummy 2 for Muslim culture which indicates in the results positive and significant impact on the basmati export from Pakistan. Muslim countries like to eat rice so our results affirmed it that basmati export from Pakistan has a positive relation with Muslims country. The exchange rate of Pakistan and basmati exports from Pakistan have a positive relationship. One unit change in the exchange rate will increase 0.01 percent of basmati export from Pakistan. It means when money devaluates in Pakistan, the export of basmati rice increases because earnings will be high from trading partners. Basmati export from Pakistan and the exchange rate of trading partners have significant relations.

Table 6. Factors affecting basmati exports from Pakistan.

Variable	Coefficient	SStd. Error	t-Statistic	Prob.
C	123.7038	119.7629	1.032905	0.3024
BPROI (production)	-0.000264	0.000129	-2.048350	0.0413
Joint border	-0.145090	0.877763	-0.165295	0.8688
Muslim Country	2.074116	0.466375	4.447311	0.0000
EXCHI	0.010302	0.014569	0.707125	0.4800
EXCHJ	-0.004013	0.000823	-4.874689	0.0000
LOG(GDPI)	3.546243	2.003118	1.770362	0.0776
LOG(GDPJ)	1.290028	0.247851	5.204862	0.0000
INFI	0.042679	0.029315	1.455864	0.1464
LOG(POPI)	-8.203910	7.570443	-1.083676	0.2793
LOG(POPJ)	-1.137244	0.223853	-5.080308	0.0000
R-squared	0.591848	Mean dependent var		2.648441
Adjusted R-squared	0.579053	S.D. dependent var		2.842722
S.E. of regression	1.017316	Sum squared resid		330.1434
Durbin-Watson stat	1.994517	J-statistic		0.766294
Instrument rank	12	Prob(J-statistic)		0.381366

If one unit change in the exchange rate of the trading partner will decrease by 0.004 percent in basmati export from Pakistan. Basmati export from Pakistan and the inflation rate of Pakistan have a positive relationship. If one unit change in inflation, it will increase 0.04 percent change in basmati export from Pakistan. Basmati export from Pakistan and the gross domestic product of Pakistan have significant and positive relations. If one unit change in the gross domestic product of Pakistan will increase in 3.5 percent increase in basmati export from Pakistan. Basmati export from Pakistan and gross domestic product of the trading partner have a significant and positive relationship. One unit change in gross domestic product of trading partner will increase 1.2 percent in basmati export from Pakistan. Basmati export of Pakistan and population of Pakistan have negative relation. One unit change in the population of Pakistan will decrease 8.2 percent in basmati export from Pakistan. Basmati export from Pakistan and the population of trading partners have significant and negative relations. One unit change in the population of trading partners will decrease 1.13 percent in basmati export from Pakistan. Durbin Watson value is 1.99 and the value of R-squared is 0.59 which shows the problem of autocorrelation is absent in the model.

CONCLUSIONS
Basmati export is very important in the agriculture sector to promote the economic growth of Pakistan. The results show that the variable of the joint border has a negative and insignificant impact on basmati exports. Good relations of Pakistan with their neighbour countries can help to promote the export of basmati rice from Pakistan. Results show that the dummy variables of a Muslim country have a positive and significant impact on the basmati flow from Pakistan to that country. It shows that if the Muslim country is the trading partner, it will have a positive impact on basmati exports. Pakistan needs to focus more on the basmati exports to the Muslim markets as compared to Non-Muslim markets. Basmati production in Pakistan has a negative and significant impact on basmati export from Pakistan. Basmati production in Pakistan didn't directly affect the basmati export from Pakistan but the international and domestic prices of basmati can affect the basmati flow from Pakistan. If the international prices of basmati are lower than the domestics prices of basmati then basmati production couldn't affect the basmati export from Pakistan. So Pakistan needs to reduce the domestic prices of basmati as compare to international prices. The government should give relief or subsidies to the domestic producer of basmati rice so they can produce basmati at low cost and Pakistani exporters of basmati may compete in the international market. Pakistan also needs to reduce the inflation rate. Results show that the population of the trading partner has a negative and significant impact on basmati export from Pakistan. Results show that the exchange rate of the trading partner has a negative and significant impact on basmati export from Pakistan. Pakistan should target those countries which have a lower exchange rate. The gross domestic product of the trading partner has a positive and significant impact so Pakistan

should export basmati to those countries which have a high Gross domestic product.

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