

Research Article



Performance and Macroeconomic Determinants of Basmati Rice Exports from Pakistan

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Abstract | The main aim of this paper is to review and evaluate the performance of Pakistani basmati to international markets and to estimate the impact of different factors on basmati export from Pakistan. For this purpose, panel data of eleven markets are collected from 2003 to 2016. Independent macroeconomics variables used in the study are exchange rate of Pakistan, exchange rates of trading partner, inflation in Pakistan, inflation in trading partner and dummy variables joint border and religion by application of Park's Feasible Generalized Least Square (FGLS). Result of this study showed that exchange rate of Pakistan has negative and significant effect on basmati export but exchange rate of trading partner has positive and significant effect on basmati export of Pakistan to its trading partner. The inflation in Pakistan has negative and significant effect on basmati exports from Pakistan to its trading partner. If Pakistan wants to improve its export value of basmati rice, there must be an effective strategy to control the inflation in Pakistan or at least need to make policy for minimizing the impact of inflation for the rice producers. If it is very difficult to control the inflation there must be subsidies for rice growers for inputs used in the basmati production. The high rates of inflation in trading partners have positive and significant impact on the demand of Pakistani basmati is an indication for Pakistani exporters to mark extra motivation on those international markets where inflation is comparatively high. Dummy variables for Muslims and joint borders have positive and significant impact on basmati export flow from Pakistan to its trading partner. The results of dummy variables showed that there must be more emphasis on the neighbor and Muslim countries for improving the export value of Pakistani basmati.

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Keywords | Basmati exports, Export performance, Macroeconomic determinants, Pakistan, Park's feasible generalized least square

Introduction

In the economy of Pakistan, agriculture sector plays an important role by contributing 19.5 percent

to the GDP and providing the employment to 42.3 percent of the labor force of Pakistan (GOP, 2016-2017). The agriculture sector of Pakistan plays the main role in the development of the country and for

improving the food security conditions along with poverty elimination. In Pakistan the export value was US \$24.2 billion in 2016. Export of Pakistan have decline from US\$29.18 in the year 2011 to US\$ 24.2 billion in the year 2016. Pakistan export have decline at an annual rate of -4.1% during the last five years. Pakistan is the 3rd largest leading exporter and 12th largest rice producer in the world (TDAP, 2018). Import value was US\$ 48.1 billion in 2016 and making the Pakistan 49th largest importer in the world. Import of Pakistan have increased from US\$ 44.6 billion in 2011 to US\$ 48.1 billion in 2016. Pakistan import have increased at an annual rate of 1.3% in 2016 (OEC, 2018).

The top export terminals of Pakistan are the United States, China, Germany, Afghanistan and the United Kingdom and share of these countries in Pakistan exports were 8.0, 7.0, 7.0, 5.9, and 15 percent in 2016. The top import markets of Pakistan are United States, China, United Arab Emirates, Indonesia and Japan. In Pakistan trade share with China was 30 percent, 12 percent with United Arab Emirates, 3.9 percent with Saudi Arabia, 3.5 percent with India and 4.3 percent with United States respectively (OEC). Major Export item of Pakistan are Linen, Rice, Non-Knit Suit, cotton yarn and pure woven cotton and major import item of Pakistan are Refined petroleum, palm oil, petroleum gas and scrap iron. In net imports Pakistan had a negative trade balance in 2016 (OEC, 2018). Due to flavor and fragrance and its long varieties basmati rice is being liked in the world market. A few rice exporter has been controlled the rice market such as Pakistan, Thailand, India and Vietnam because of these countries contribute 60 to 70 percent in the rice world market. In 2013, the rice export of Pakistan declined by 19%. After Iran and Saudi Arabia, United Arab Emirates is a major rice importer with the 13 percent market share and Iran and Saudi Arabia with the 7 or 6 percent market share contribute in the rice world market as an importer.

The total value of Basmati rice export from Pakistan was 480009 thousand US dollars in 2017 (ITC, 2017). About 74 percent of total value of basmati was exported to eleven major markets of UAE, Saudi Arabia, Oman, Yemen, Belgium, UK, USA, Kazakhstan, Spain, Kenya, Qatar, Australia, Italy and Canada as shown in Figure 1. Meanwhile the production cost has enhanced in Pakistan over time due to inflation and the rice farmers are not achieving

their due margin (Javed et al., 2015). The aim of this paper is to review the performance of Pakistani basmati rice to international markets and to estimate the impact of different factors on basmati exports from Pakistan.

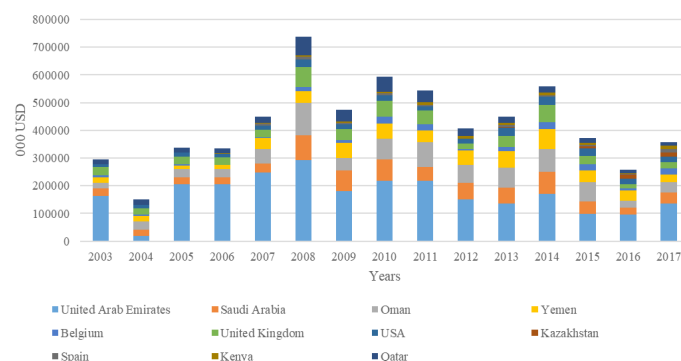


Figure 1: Exports of basmati from Pakistan to major markets. Source: ITC, 2018.

Pakistan is the fourth largest exporter of rice in the world by volume, and rice is the second largest country that receives exports after cotton. This status was achieved in the early nineties due to the liberalization of the rice trade and the opportunity for the private sector to act independently. The one-sided influence of this liberalization has pushed goods to the current state of export (Taniguchi and Ali, 2018). However, the initial impact once increased the stabilization of productivity, exports and prices of Pakistani rice varieties, especially basmati. Over the past decade, growth in total rice exports from Pakistan has remained unchanged, while in the case of basmati, it has declined significantly. Various macroeconomic factors affect current rice exports from Pakistan (including basmati). The current study is aimed to assess the impact of these macroeconomic factors on basmati exports so that proper policies should be adopted to improve the performance of Pakistan in basmati exports.

Akhtar et al. (2007) has been suggested that it is necessary to identify markets in which Pakistan basmati rice has comparative advantage and therefore they have projections for future development to deal with new opportunities and fears lie in marketing at domestic and foreign market in basmati rice. Ilyas et al. (2009) has been used the Balassa and white index of revealed comparative advantage and competitiveness correspondingly and the result of this study showed that Pakistan is the most competitive nation in the rice trade and ranked first in the merchandised exports and agricultural trade. Javed et al. (2017) has

been used the revealed comparative advantage (RCA) and revealed systematic comparative advantage (RSCA) to observe the exports of main agricultural commodities from Pakistan to UAE with emphasis on comparative advantage. As per results of this study, the Pakistani Basmati rice has clearly showed its comparative advantage.

According to the reports of [Jafar et al. \(2015\)](#) that Pakistan economy is based on agriculture sector and the exports of agricultural products is the main source of foreign exchange earnings. Rice export played an energetic role in country economy. Thus the Pakistan economy has lost its more than 30 percent share from gulf countries via rice exports during previous three decades. The operation cost to import is significantly lower than exportation which is inversely affecting the competitiveness of country export. [Akmal et al. \(2014\)](#) examined that basmati rice share has reduced 15% in the world market because Pakistan relying only on few import markets. The main cause of this reduction is that Pakistan did not maintain its comparative advantage position of basmati rice export in market and Pakistan did not discover new markets. In international market Pakistan agriculture commodities have good reputation but due to some issues such as Pakistan has lack of knowledge about trade trend, market access, licensing and transportation problems of exports is not increasing consistently. [Riaz and Jansen \(2012\)](#) analyzed the flow of actual exports and calculated the measures of revealed comparative advantage. [Javed et al. \(2015\)](#) examines the collision of main determinants of rice exports from Pakistan to UAE market and this study examined the two rice varieties namely supper basmati and Pk-386. The result of this study showed that export of basmati rice is effected by education, age, average purchase price, average sales price and export of Pk-386 is effected by age, average purchase price and average market cost. [Adhikari and Sekhon \(2014\)](#) has showed that lagged production, international price, export price, domestic consumption and exchange rate are the major determinants of rice export from India. [Javed et al. \(2015\)](#) analyzed the impact of major determinants of rice export from Pakistan to UAE market and this study examined the two rice varieties namely supper basmati and Pk-386. The results of the model for super Basmati exports to United Arab Emirates market showed that education, average purchase and sale prices affected its export and the results of the model of Pk-386 showed that age, average purchase

price and average market cost affected its export. [Javed and Ghafoor \(2013\)](#) recommended that appropriate management policy should be implemented in rice export by covering home production base, steering the peaked markets prices and knowledge the importance about these variables for increasing the rice exports from Pakistan. A study was conducted about the export margin analysis and the factors affecting the rice exports from Pakistan to UK. [Javed et al. \(2016\)](#) examined the factors disturbing the trade connecting Pakistan and UAE and in this study the impact of different factors were determined by means of the gravity model of the panel data. The results of this study were clearly explained that Pakistan have less trade with joint border countries comparatively to those nations which have no joint border and the distance between the countries have an inverse impact but this was not significant.

Materials and Methods

The panel data of eleven markets is collected from 2003 to 2016. The dependent variable used in the study is the value of basmati export from Pakistan to trading partner. Independent macroeconomics variables used in the study are exchange rate of Pakistan, exchange rates of trading partner, inflation in Pakistan, inflation in trading partner and dummy variables joint border and religion. The time series data is collected from period 2003 to 2016 from the international trading center about the export values and export quantities of basmati rice from Pakistan to all major trading partners of Pakistan. The data about exchange rate are taken from State bank of Pakistan. In this study dummy variable for boarder and for Muslim are used in the models.

Test for panel unit root

Different tests have been used in this study in order to examine the presence of unit root in panel data. These are PP-Fisher Chi-square, ADF-Fisher Chi-square, Pesaran, Shin W-stat and Levin, Lin and Chu t^* . The data have the unit root is the null hypothesis of these tests, while the data does not have the unit root is the alternative hypothesis.

Feasible generalized least square method (FGLS)

FGLS method is used in this Study to check the impact of different factors on Nominal Protection coefficient (NPC) and on Pakistan basmati rice export from Pakistan to different trading partner countries.

Complex error structures can be considered for these Panel data. If the existences of non-spherical errors are not properly addressed, it will create inefficiency in the estimation of coefficient and biasedness of standard error. And the Autocorrelation problem has long been admitted as a potential problem for the panel data, because panel data mostly have been used to handle both autocorrelation and cross sectional dependence (Reed and Ye, 2011). One estimator that is Park's Feasible Generalized Least Squares (FGLS) estimator (Parks, 1967). However, it can only be implemented when the number of time periods (T) is greater than or equal to the number of cross-sections (N) (Reed and Ye, 2011).

The equations used in the study are given as under:

$$BE_{ijt} = \beta_0 + \beta_1 \log(EXCH_{it}) + \beta_2 \log(EXCH_{jt}) + \beta_3 \log(CP_{it}) + \beta_4 \log(CP_{jt}) + \beta_5 IJB_{ijt} + \beta_6 DM_{ijt} + U_{ijt} \dots (1)$$

Where, i= Pakistan; j=Trade partner of Pakistan; t= time period; BE_{ijt} = Basmati rice export from Pakistan to trade partner (000 US Dollar); $EXCH_i$ = Currency exchange rate in Pakistan; $EXCH_j$ = Currency exchange rate in trading countries; CP_{it} = Inflation in Pakistan; CP_{jt} = Inflation in trade partner countries; JB_{ij} = Dummy variable for joint boarder between Pakistan and trade partner; DM_j = Dummy variable for whether population of Pakistan trade partner Muslims or non- Muslims; U_{ij} = Error term, t= Time period, β_s = Coefficients.

Results and Discussion

UAE (United Arab Emirates) is a budding market for Pakistani products (Javed et al., 2015) having imports of 28 percent of total basmati exported from Pakistan in 2017. Figure 2 showed the trend of basmati export from Pakistan to United Arab Emirates for the time period 2003-2017. During the time period under consideration that there is a fluctuation in Pakistani basmati exports to United Arab Emirates. The value of basmati exported from Pakistan to UAE was 162525 thousand US dollars in 2003. The lowest value of basmati exports from Pakistan to UAE was in 2004 which was 17851 thousand US dollar. The highest value of basmati was 291360 thousand US dollars which was exported in 2018. The value of basmati exported to this market is 137002 thousand US dollars in 2017. Graph shows a declining trend after 2008 with small fluctuations.

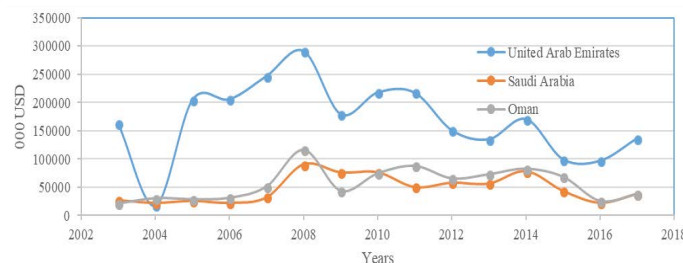


Figure 2: Basmati Exports to United Arab Emirates, Saudi Arabia and Oman.

Source: ITC, 2017

The 2nd market for basmati is Saudi Arabia after United Arab Emirates. According to 2017 a total value of 38675 thousand US dollars is exported to Saudi Arabia. The market of Saudi Arabia is 2nd attractive market for Pakistani exporters after United Arab Emirates. The highest value of basmati exported to this market was 90897 thousand US dollars exported in 2008. Oman is the third trading basmati market after United Arab Emirates and Saudi Arabia. The basmati rice export value to Oman was 38235 thousand US dollars in 2017.

The total value of basmati rice exports from Pakistan to Yemen was 22698 thousand United States dollars in 2017. The highest value of 70284 thousand US dollars was exported to Yemen as shown in Figure 3. The fifth market of Pakistan basmati rice was Belgium with a total value of 22698 thousand US dollars in 2017. The highest value exported to this market was 26643 thousand US dollars in 2014. United Kingdom is high valued market for basmati with 36.12 percent export margin (Javed and Ghafoor, 2013). The total basmati export to United Kingdom has a value of 20445 thousand US dollar in 2017. The highest value of basmati exported to this high value market was 71518 thousand US dollars in 2008.

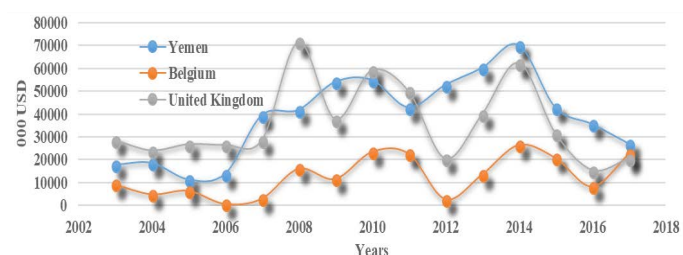


Figure 3: Basmati Exports to Yemen, Belgium and United Kingdom.

Source: ITC, 2017.

The total value of basmati rice export from Pakistan to USA was 19623 thousand United States dollars in 2017. The highest export value of basmati to this market was 30361 thousand US dollars in 2013.

Table 1: Descriptive statistics of the variables.

Variables	No of observations	Min.	Max.	Average	Standard deviation
Basmati export	154	0.41	302544	44622.31	58145.86
Currency exchange rate in Pakistan	154	57.75	104.77	80.27	18.05
Currency exchange rate in trading countries	154	0.38	30914.85	1325.93	4771.63
Inflation in Pakistan	154	2.54	20.28	9.01	4.59
Inflation in trade partner countries	154	0.05	39.26	6.42	7.20
Dummy (Religions)	154	0	1	0.64	0.48
Dummy (Joint boarder)	154	0	1	0.09	0.29

Source: Author's calculations.

Table 2: Unit root statistics of panel data.

Variables	Data type	Levin, Lin and Chut	Pesaran and Shin W-stat	ADF- Fisher Chi-Square	PP-Fisher Chi-Square
Currency exchange rate in Pakistan	Level data	0.518	0.6461	0.868	0.439
	First difference	0.000	0.000	0.000	0.000
Currency exchange rate in trading countries	Level data	0.000	0.000	0.0002	0.0001
	First difference	0.000	0.000	0.000	0.000
Inflation in Pakistan	Level data	0.0467	0.1309	0.3758	0.384
	First difference	0.000	0.000	0.000	0.000
Inflation in trade partner countries	Level data	0.000	0.0005	0.0019	0.0006

Source: Author's calculations.

Total export value of basmati exports from Pakistan to emerging market of Kazakhstan was 15791 thousand US dollars in 2017. Pakistan exported total value of 13432 thousand US dollars to Spain in 2017. Total amount of 12731 and 12577 thousand dollars were sent to Kenya and Qatar respectively as shown in Figure 4. The market of Qatar has high value of basmati imports from Pakistan in 2008 as compared to USA and Kazakhstan but in 2017 the value of basmati export to this market decreased rapidly. The graphical presentation shows that there is less potential in Qatar as compared to Kazakhstan. The current study was conducted to review the performance of Pakistani basmati exports to its major markets along with estimation of impact of different macroeconomic variables on the basmati exports by using the panel data set.

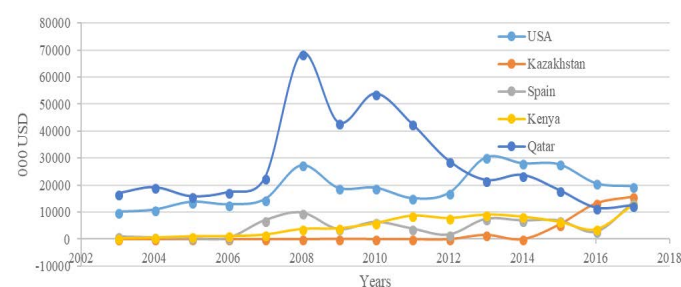


Figure 4: Basmati exports to USA, Kazakhstan, Spain, Kenya and Qatar. Source: ITC, 2017

The macroeconomic variables include currency exchange rates of Pakistan and its markets where basmati is exported. The summary statistics of these macroeconomics variables are given in Table 1. Other macroeconomic variables are inflation in Pakistan and inflation in trading partner.

The statistical methods which are (Levin Lin and Chu), Im, Pesaran and Shin W-stat, ADF-Fisher Chi-square, PP-Fisher Chi-square) show that $EXCH_i$ and CP_i are non-stationary at level data and insignificant and both variables are significant and stationary when transferring the data into first difference. Statistics of four test shows that $EXCH_i$ and CP_i are significant at level and data of these variables are stationary at level form as shown in Table 2.

Table 3: Statistics of correlation of variables.

Variables	VIF
Currency exchange rate in Pakistan	6.12
Currency exchange rate in trading countries	4.40
Inflation in Pakistan	3.89
Inflation in trade partner countries	2.13
Dummy variable for Muslims	1.27
Dummy for joint border with trading partner	4.55

Source: Author's calculations.

Table 4: Result of park's feasible generalized least square model.

Variables	Coefficient	S.E	z value	p> z
Currency exchange rate in Pakistan	-2.78286	1103.73	2.82	0.005
Currency exchange rate in trading countries	0.00389	1.72	2.54	0.011
Inflation in Pakistan	-2.12053	937.08	2.4	0.016
Inflation in trade partner countries	3.00573	750.37	3.74	0.001
Dummy (Religion)	93.20729	30618.96	3.24	0.001
Dummy (Joint boarder)	62.0672	9771.50	6.18	0.002
Constant	-49.9067	7954.51	1.42	0.155

Source: Author calculation.

VIF value for all the variable which has showed in Table 3 is less than 10 so there is no problem of multicollinearity exist in the data. The objective of this manuscript is to examine the impact of different factors on the Pakistani basmati export and for estimating the impact of these factors on rice export. Table 4 shows the result of FGLS. According to the results, exchange rate of Pakistan negatively affecting the basmati export. The coefficient of domestic exchange rate is -2.78. One percent increase in domestic currency (Pakistani currency appreciate) would decreased the export by 2.78 thousand US Dollars. Higher value currency makes the country export more expensive in foreign markets and import less expensive. Exchange rate of trading countries is positively affecting the Pakistani basmati export. One percent increase in exchange rate of trading partner would increase the Pakistan basmati export by 0.003 thousand US Dollars and value of coefficient is significant. The inflation of Pakistan is negatively affecting basmati export and the value of coefficient of CPI is -2.12 which is highly significant.

One percent rise in inflation of Pakistan would reduce the basmati rice export by 2.12 thousand US dollar from Pakistan to trading partner. The estimated coefficient value of inflation of trading partner is 3.00 in Table 4 shows that one percent increase in inflation in trading countries would increase the Pakistani basmati export by 3 thousand US Dollars which is also significant. Joint Boarder is positively and significantly affecting the Pakistan basmati export. Dummy for Muslims also has a positive and significant impact on basmati exports from Pakistan. If Muslims has a major share in trading partner's population basmati export would increase to that market, because dummy variable of Muslim shows positive and significant impact of basmati exports. Pakistan need to concentrate more for increasing rice

exports to those countries where share of Muslims in population is comparatively high.

Conclusions and Recommendations

Exchange rate of Pakistan has negative and significant effect on basmati export but exchange rate of trading partner has positive and significant effect on basmati export of Pakistan to its trading partner. The inflation in Pakistani has negative and significant effect on basmati exports from Pakistan to its trading partner. If Pakistan wants to improve its export value of basmati rice, there must be an effective strategy to control the inflation in Pakistan or at least need to make policy for minimizing the impact of inflation for the rice producers. If it is very difficult to control the inflation there must be subsidies for rice growers for inputs used in the basmati production. The high rates of inflation in trading partners have positive and significant impact on the demand of Pakistani basmati is an indication for Pakistani exporters to mark extra motivation on those international markets where inflation is comparatively high. Dummy variables for Muslims and joint boarders have positive and significant impact on basmati export flow from Pakistan to its trading partner. The results of dummy variables showed that there must be more emphasis on the neighbor and Muslim countries for improving the export value of Pakistani basmati.

Novelty Statement

In literature we are unable to find enough studies on single export products from Pakistan to potential markets. After the estimation of competitiveness of basmati for different target markets, The current study underhand is the novel study in which an attempt was

made to estimate the impact of different macroeconomic factors of basmati exports to the existing and potential markets.

Author's Contribution

Iqbal Javed: Conceptualization, writing of original draft, and technical input at every step.

Abdur Rehman: Methodology and review of literature.

Iftikhar Nabi: Data analysis and preparation of first draft.

Amar Razzaq: Data formatting and analysis.

Raheel Saqib: Results and discussion.

Allah Bakhsh: Review and minor revisions and formatting.

Muhammad Mohibullah: Wrote introduction, and conclusion.

Muhammad Luqman: Data collection, writing and minor revisions.

References

- Akmal, N., W. Akhtar, H. Shah, M.A. Niazi and T. Saleem. 2014. The structure and competitiveness of Pakistans basmati rice exports. *Asian J. Agric. Rural Dev.*, 4(4): 304.
- Akhtar, W., M. Sharif and N. Akmal. 2007. Analysis of conomic efficiency and competitiveness of the rice production systems of Pakistan's Punjab. <https://doi.org/10.35536/lje.2007.v12.i1.a7>
- Adhikari, A., 2014. Export of rice from India: Performance and determinants (Doctoral dissertation, Punjab Agricultural University, Ludhiana).
- Adhikari, A. and Sekhon, M.K., 2014. Export of Basmati rice from India: Performance and trade direction. *J. Agri. Develop. Policy*, 24(1): 1-13.
- Abdullah, M., J. Li, S. Ghazanfar, J. Ahmed, I. Khan and M.N. Ishaq. 2015. Where Pakistan stands among top rice exporting countries, an analysis of competitiveness. *J. Northeast Agric. Univ. (English Edition)*, 22(2): 80-86. [https://doi.org/10.1016/S1006-8104\(15\)30036-2](https://doi.org/10.1016/S1006-8104(15)30036-2)
- Balassa, B. and D.M. Achydlowsky. 1972. Domestic resource costs and effective protection once again. *J. Polit. Econ.* 80: 63-69. <https://doi.org/10.1086/259861>
- Chand, R., 1999. Are disparities in Indian agriculture growing? Policy Brief 8. National centre for agricultural economics and policy research (NCAP), New Delhi, India. pp.10-53.
- Gulati, A., J. Hanson and G. Pursell. 1990. Effective incentives in India's agriculture cotton groundnuts, wheat and rice. Policy, Plann. Res. Working Paper No. WPS 332. World Bank. pp. 20-24.
- GOP. 2016-2017. Economic survey of Pakistan. Economic advisor's wing, finance division, Islamabad Pakistan.
- Ilyas, M., T. Mukhtar and M.T. Javed. 2009. Competitiveness among Asian exporters in the world rice market. *Pak. Dev. Rev.*, 48: 783-794. <https://doi.org/10.30541/v48i4Ipp.783-794>
- ITC, 2017. Trade maps: Trade statistics for international business development. International Trade Center, Geneva, Switzerland.
- Javed, I. and A. Ghafoor. 2013. Determinants of rice export from Pakistan. *Proc. Sixth Int. Conf. Manage. Sci. Eng. Manage.* Springer, London. pp. 793-801. https://doi.org/10.1007/978-1-4471-4600-1_68
- Javed, I., A. Ghafoor, A. Ali, M.A. Imran and M. Ashfaq. 2015. Margins and determinants of rice export from Pakistan to UAE market. *Pak. J. Agric. Sci.*, 52(2): 557-563.
- Javed, I., G. Mustafa, M. Ashfaq, R. Yasmeen, A. Ghafoor, M. Yasin and M.A. Imran. 2018. Competitiveness in agricultural trade of Pakistan with United Arab Emirates. *Pak. J. Agric. Sci.*, 55(3): 703-711.
- Javed, I., M. Ashfaq, S.A. Adil and K. Bakhsh. 2016. Analysis of agricultural trade between Pakistan and United Arab Emirates: An application of gravity model. *J. Agric. Res.*, 54(4): 785-799.
- Jafar, R.M.S., A. Rabnawaz, S. Hussain, W. Ahmed and P. Zhuang. 2015. Aptitudes of Pakistani rice industry with respect to global trade. *J. Econ. Sustain. Develop.*, 6(22): 8-12.
- Javed, I., M. Ashfaq and N. Anwar. 2017. Exports of major agricultural products from Pakistan to United Arab Emirates: Performance and comparative advantage. *Sci. Technol. Dev.* 36(1): 53-60.
- Latruffe, L., 2010. Competitiveness, productivity and efficiency in the agricultural and agri-food sectors. *OECD Food, Agric. Fish. Papers*, No. 30, OECD Publishing, Paris. pp. 6-63.
- OECD, 2018. Overseas Employment certificate, "n.d", <https://atlas.media.mit.edu/en/profile/country/pak/>
- Parks, R. 1967. Efficient estimation of a system

- of regression equations when disturbances are both serially and contemporaneously co-related. *J. Am. Stat. Assoc.*, 62: 500-509.
- Riaz, K. and H.G. Jansen. 2012. Spatial patterns of revealed comparative advantage of Pakistan's agricultural exports. *Pak. Econ. Soc. Rev.*, pp. 97-120.
- Reed, W.R. and H. Ye. 2011. Which panel data estimator should I use? *Appl. Econ.*, 43(8): 985-1000. <https://doi.org/10.1080/00036840802600087>
- Rakotoarisoa, M. and A. Gulati. 2006. Competitiveness and trade potential of India's dairy industry. *Food Policy*. 31: 216-227.
- <https://doi.org/10.1016/j.foodpol.2006.03.003>
- Taylor, D.S. and P.T. Philips. 1991. Food-pricing policy in developing countries: Further evidence on cereal producer prices. *Am.J. Agric. Econ.* 73: 1036-1043. <https://doi.org/10.2307/1242431>
- Taniguchi, K. and S.M. Ali. 2018. Investment in research and development for basmati rice in Pakistan. *Environ. Nat. Resour. Agric. Div., Cent. West Asia Dep.*, No.7, Asian Dev. Bank, 6 ADB Avenue, Mandaluyong City, 1550 Metro Manila, Philippines.
- TDAP (Trade Development Authority of Pakistan). 2018. Exports from Pakistan - Finals Statistics. <http://www.tdap.gov.pk/tdap-statistics.php>.