

Research Article



Margin and Determinants of Mandarin (Kinnow) Export from Pakistan

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Abstract | Brazil is the largest citrus producing country in the world. Pakistan stands at the number 12th among citrus producing country. Pakistan is the world largest producer of citrus reticula variety (kinnow). The current study under hand is conducted to find the margin and determinants of kinnow exports from Pakistan to international markets of UAE and USA by using the primary data. Primary data is collected through pretested questionnaire from 30 kinnow exporters out of total 40 exporters. Personal interviews were conducted by selecting convenient sampling technique. Along with export margin analysis of both markets, an effort is made to quantify impact of the major determinants on export of mandarin (Kinnow) to UAE and USA. According to data properties and suitability, multiple regression analysis technique is used for UAE and binary logistic regression technique was used for USA market. According to the finding, gross export margin for USA market is Rs. 30644 per ton and percent export margin is 70 percent while Net export margin is found as Rs. 14076.074 per ton. While in case of UAE market, Gross export margin is estimated as Rs.21601.2 per ton. For the Market of UAE, percent export margin is 64 percent whereas net export margin is Rs. 8583.294 per ton. In case of factors affecting the kinnow export to USA, the coefficient of education is 0.124, which shows positive and significant impact of education on kinnow export from Pakistan to USA. The coefficient of packing cost is -0.039 that shows negative but highly significant effect. The coefficient of international sale price was 0.003 that showed positive sign and highly significant. In case of factor affecting the kinnow exports to UAE, the coefficient of age of exporter is positive and highly significant. The coefficient of exporter's experience is 178.961 that significantly affect the kinnow export of Pakistan. The coefficient of freight charges is -1945.897 that shows negative signs but highly significant. The coefficient of international sale price is 182.995 that shows positive sign and significant. The coefficient of domestic price is -1175.480 that show negative but highly significant.

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Introduction

Citrus fruit is the most important tree fruit crop in the world. Brazil is the largest citrus producing country in the world. Pakistan stands at the number 12th among citrus producing country.

Pakistan is the world largest producer of citrus reticula variety (kinnow). Mandarin (Kinnow) is of significance to Pakistan. Kinnow is a cross between 'King' and 'Willow leaf' species of Citrus Fruit, successfully experimented at the Citrus Research Centre, University of California, USA in 1951.

Both of these parents have Indo-China origins. The soil and climatic conditions in Pakistan have given 'Kinnow' a unique flavor which distinguishes it from other comparable cultivars (mandarins) grown in the World. In Pakistan citrus fruits are grown on an area about 192832 hectares with a production of 2344 thousand tons and 440 thousand tons worth of Rs. 34,088 million are exported (GOP, 2017). Pakistani kinnow has a unique taste and is demanded all over the world due to its juicy, soft and scented characteristic. This is primarily due to the soil constituency and climate under which it grows. Pakistan stood at 10th position in total fresh citrus exporting countries and 5th position in fresh Tangerine/ Mandarins (kinnow) exporting country in the world. World total export of fresh tangerine /Mandarins estimated at 4404.8 thousand ton (FAO, 2016) out of which Pakistan fresh kinnow export is 294.359 thousand ton.

Pakistan is recognized as a producer and exporter of kinnow mandarins around the world. A majority of the country's production comes from the Sargodha region where the fruits are produced and processed. Pakistan has monopolized in kinnow farming. Winter of Punjab province provides an excellent atmosphere for this fruit and the resulting fruit is juicy, soft, scented and has a unique taste. Punjab province is the major contributor of the mandarin production in Pakistan. Nearly 453.30 thousand acres are cultivated in Punjab province with 2328.10 thousand ton production (GOP, 2015). Among all citrus producing districts, Sargodha is ranked 1st in area and production (46 percent and 54 percent respectively) of citrus (GOP, 2006). It is about 23% of Pakistan's total citrus plantings, producing around 650,000 metric ton of fruit each year.

There could be many factors which may be responsible for low performance of Pakistan in kinnow exports instead of having potential. These factors could be the inappropriate facilities for storage of perishable commodities. Citrus exports from Pakistan is decreasing and facing many policy challenges for getting long term impact on export performance especially for USA market. United Arab Emirates (UAE) has been proved a potential market for Pakistani agricultural commodities because Pakistan has strong relations with United Arab Emirates. Anwar et al., (2011) conducted a Value Chain Analysis and concluded that by decreasing the number of the intermediaries in both form i.e. open and packed. Not

only the purchased price of the consumer decreased but also producer received high profit. Mohy-ud-Din et al. (1993) investigated the problems in export of kinnow from Pakistan by using the secondary data and explained that Kinnow was exported mainly to two markets i.e. the Middle East and the Far East. According to them many of the large growers intend to export kinnow themselves. But due to lack of financial resources, trained manpower, information about international market and know-how in export business as well as lack of infrastructure, they are unable to do so. They suggested that the growers should be encouraged by providing them necessary facilities. Exporters should also be provided with the facilities like rebate on income tax, cold storage at airports and seaports, credit and foreign currency, packaging and international market intelligence services.

Iqbal et al. (2009) measured the Technical Efficiency (TE) of citrus farmers in Sargodha district based on primary data collected from 162 selected farms for the years 2005-06 and 2006-07. Malmquist Indices revealed a drastic decrease in the technical change, scale efficiency and total factor productivity change over time. The 'inverse farm size productivity relation' was also observed on citrus orchard possessing farms. Tahir (2014) checked out the trend analysis of export quantity and export value for citrus in Pakistan. Forecasted values were very close to actual values and have positive increasing trend in Pakistan. Ahmed and Ying (2015) conducted a study and showed that the experience, picking time and picking method had significant effect on losses at farm level. Whereas experience, loading method, storage place showed significant effect on losses at wholesale market level and unsold quantity. Type of retailers was the significant determinants of losses at retail level.

Materials and Methods

The current study under hand is based on primary data collected from kinnow exporters from district Sargodha. The primary data from kinnow exporters were collected by convenient sampling techniques. Total population size was 40 citrus exporters from the district Sargodha. The sample size of the current study was 30, and pretested questionnaire was used during the personal interview. The study under hand is conducted to calculate the export margins of kinnow exports from Pakistan to United Arab Emirates and United States of America. There are many factors

those have effect of individual export quantity with respect to individual exporter. The nature of current study based on primary data is estimate the factors of performance of exporters. There are many factor i.e. education of exporter and experience of exporter, responsible for improvement in performance of kinnow exporters in case growth in export quantity from Pakistan to international markets. Other marketing costs could positively affect the interest of investors to export the kinnow from Pakistan. However, the current study is aimed to calculate the all marketing costs to find out the margin in kinnow exports from Pakistan. For this purpose, two international markets of United Arab Emirates and USA is selected. For the market of UAE, the collected data are analyzed through employing multiple regression technique.

Estimating the impact of different variables of Kinnow exports in case of UAE market, Functional form for the analysis is given as in equation:

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + \mu \dots (1)$$

Where;

Y= Total quantity of Kinnow export in 2017.

In case of kinnow exports to USA market, Binary Logit Model (Hosmer and Lemeshow, 2000) was used for analyzing the collected data for estimating the impact of different variables on kinnow exports for USA market. Binary logit model is used in condition where dependent variable is in qualitative form. Following the different studies (Alemayehu et al., 2010; Kinyua et al., 2011; Lubungu, 2016; Ghafoor et al., 2017) the equation of Binary Logit model is:

$$\text{logit}(E[Y_i|X_i]) = \text{logit}(P_i) = \ln\left[\frac{P_i}{1-P_i}\right] = \beta_iX_i + e \dots (2)$$

Where;

P =Probability of farmer's choice of model or traditional market (Y); X_i= A set of core explanatory variables; β_i= A vector of unknown variables; e= Disturbance term; The relationship between dependent and independent variables is shown in the following equation.

$$Z_i = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + e_i \dots (3)$$

Where;

Y variable is the qualitative variable with a value of 1 and 0. The exporter who is exporting to the USA is

taken as 1, and the exporter who is not exporting to the USA market is taken as 0 as a dependent variable.

Independent variables used in the current study are as under;

X₁= Age of Kinnow exporters (years); X₂= experience of exporters; X₃= Education of Kinnow exporters (Total number schooling years); X₄= Average processing cost of Kinnow (Rs. /Ton); X₅ = Average packing cost of Kinnow (Rs. /Ton); X₆ = Freight charges (Rs. /Ton); X₇= International price of Kinnow (Rs. /Ton); X₈ = Domestic price of Kinnow (Rs. /Ton); β₀ is the intercept, β_s are the elasticity of X_s input with respect to output y and μ is the random error.

Results and Discussion

The study under hand is conducted to calculate the export margins of kinnow exports from Pakistan to United Arab Emirates and United States of America. There are many factors those have effect of individual export quantity with respect to individual exporter. The nature of current study based on primary data is estimate the factors of performance of exporters. There are many factor i.e., education of exporter and experience of exporter, responsible for improvement in performance of kinnow exporters in case growth in export quantity from Pakistan to international markets. Other marketing costs could positively affect the interest of investors to export the kinnow from Pakistan. Along with export margin analysis of both markets, an effort is made to quantify impact of the major determinants on export of mandarin (Kinnow) to UAE and USA. According to data properties and suitability, multiple regression analysis technique is used for UAE and binary logistic regression technique was used for USA market.

Kinnow export from Pakistan to USA

Personal characteristics of exporter are age, experience and education. These socioeconomics characteristics do affect the quality and performance of business. A well-educated and experienced person can manage well business deals and decision as compared to uneducated and inexperienced person. More educated Kinnow exporters performed well while exporting Kinnow and in dealing with the parties in the Kinnow importing countries. The survey results show that average age of Kinnow exporter is 45 years. The exporter is well educated as he gets the average education i.e. 14 years of schooling. Average

experience of Kinnow exporter is 12 years in running business. The average purchase price of kinnow is found as Rs. 12613.2 per ton according to the results of the study of market margin analysis while average sale price for USA market is Rs. 43629.98 per ton. Export margin analysis is done for the kinnow exports from Pakistan to United States of America. All costs including the processing cost, packing cost, traveling cost, freight charges and other clearing charges were added to domestic prices to estimate the average export margins for kinnow exports from Pakistan to USA as shown in [Table 1](#).

Table 1: Margin analysis of Kinnow exports from Pakistan to USA.

Activity	Average (Rs/Ton)
Purchase price	12985.6
Processing charges	6500.8
Packaging charges	4817.2
Traveling expenses	2333.33
Custom clearance charges	370.37
Clearing agent charges	333.2
Freight charges	1842
Other marketing charges	371.4
All marketing cost	16568.30
Sale price	43629.98
Gross export margin	30644.38
Export margin (%)	70
Net export margin	14076.07
Net export margin (%)	29

Source: Author's calculations based on primary data.

According to the finding of the study average purchase price for USA market for kinnow was estimated as Rs. 12985.6 per ton. The average marketing cost for the managing the kinnow exports from Pakistan to USA is estimated as Rs. 16568.30 per ton. According to the findings of the margin analysis of the study underhand the average sale price of kinnow for USA is estimated as Rs. 43629.98 per ton. These prices are converted into local currency by using exchange rate during the study period (1US\$ =106Pak. Rupees). After getting the results of the market margin analysis for the USA market is estimated as Rs. 30644 per ton and percent export margin was 70 percent. The result showed that the kinnow exports from Pakistan to USA has Rs. 14076.07 per ton net export margin. It is found that the value of percent net export is 29 percent which is high as compared to the UAE market.

To estimate the impact of different factors on kinnow export from Pakistan to USA the [Equation 1](#) is used. Measure of the goodness of fit in a regression modal is R^2 called coefficient of determination. The value of R^2 lie between 0-1, measure the proportion variation that explained by explanatory variables. The value in the analysis of R^2 is 0.920 which shows that all independent variables jointly explain 0.920 percent change in kinnow export to USA. F-ratio shows the overall significant of the modal. F value 35.984 indicates that the modal is significant.

Multicollinearity among variables leads the results to wrong way but this model is free from the issue of multicollinearity as shown in [Table 2](#), each variable has the value less than 10. Multi collinearity is the undesirable situation where the correlations among the independent variables are strong which damage the analysis and lead to wrong findings.

Table 2: Multicollinearity diagnosis among independent variables for USA.

Variables	Tolerance	VIF
Age of exporter (Years)	0.236	4.23
Experience of exporter (Years)	0.432	2.31
Education of exporter (Schooling years)	0.197	5.08
Processing cost (Rs/ Ton)	0.291	3.43
Packing cost (Rs./ Ton)	0.276	3.62
Freight charges (Rs./ Ton)	0.395	2.52
International price (Rs./ Ton)	0.180	5.56

Source: Author's calculations.

More than 10 value of VIF shows the presence of problematic multicollinearity among independent variables ([Gujarati, 2003](#)). But the results of the multicollinearity diagnosis show the absence of multicollinearity in the explanatory variables used in the study.

The impact of different factors on kinnow exports from Pakistan to USA is given in [Table 3](#). According to the results, education of exporter has positive and significant relation with the kinnow export to USA. As education increases it will increase the ability to perform efficient because the exports to USA as compared to UAE is and efficient decision because of high percent export margin in USA market. The coefficient of education states that with one year extra schooling education the exporter's probability to export to USA market increases by 0.124 percent, keeping all other factors constant.

Table 3: Factors affecting the Kinnow exports from Pakistan to USA.

Variables	Coefficient	Std. Error	T-value	Prob.
Constant	-1.626	0.592	-2.749	0.012
Age of exporter (Years)	0.009	0.007	1.325	0.199
Experience of exporter (Years)	-0.008	0.007	-1.154	0.261
Education of exporter (Schooling years)	0.124	0.031	4.035	0.001
Processing cost (Rs./ Ton)	0.002	0.005	0.465	0.646
Packing cost (Rs./Ton)	-0.039	0.019	-2.027	0.055
Freight charges (Rs./ Ton)	0.029	0.008	3.547	0.002
International price (Rs./ Ton)	0.003	0.001	3.916	0.001
R ²		0.920		
Adjusted R ²		0.894		
F-value		35.984		

Source: Author's calculations.

Table 4: Export margin analysis of Mandarin (Kinnow) from Pakistan to UAE.

Activity	Average (Rs/ Ton)
Purchase price	12613.2
Processing charges	4448
Packaging charges	4463.4
Traveling expenses	2518.536
Custom clearance charges	370.37
Clearing agent charges	201.6
Freight charges	796
Other marketing charges	220
All marketing cost	13017.906
Sale price	34214.4
Gross export margin	21601.2
Export margin (%)	64
Net export margin	8583.294
Net export margin (%)	25

Sources: Author's own calculation.

The coefficient of freight charges is 0.029 which is highly significant. It means that if there is increase of one unit in freight charges it would decrease the probability of export by 0.029 percent. It was assumed that the high freight charges could lower the probability of exports but for the current study we found more net export margin for USA market which is 29 percent (as shown in Table 1) as compared to UAE which is 24 (as shown in Table 4). Hence the more freight charges for USA market is not harmful for export because USA market is more attractive due to more net export margins. The coefficient of international sale price was .003 that showed a positive and highly significant relationship with

kinnow exports to USA market. Other variables of age of exporter, experience of exporter packing cost and processing cost has insignificant relationship with exports of kinnow to United States of America.

Kinnow exports from Pakistan to UAE

According to margin analysis study underhand the average purchase price of kinnow is found as Rs. 12613.2 per ton while average marketing operations cost is found as Rs. 13017.906 per ton for UAE market. The results about margin analysis given in Table 4 showed that the average sale price received from UAE market by the exporters is found as Rs. 34214.4 per ton.

Table 5: Multi collinearity diagnosis among independent variables for UAE.

Variables	Tolerance	VIF
Age of exporter (Years)	0.184	5.444
Experience of exporter (Years)	0.354	2.825
Education of exporter (Schooling years)	0.169	5.913
Processing cost (Rs./ Ton)	0.217	4.607
Packing cost (Rs./ Ton)	0.192	5.195
Freight charges (Rs./ Ton)	0.395	2.532
International price(Rs./ Ton)	0.140	7.163
Domestic price (Rs./Ton)	0.145	6.920

Sources: Author's own calculation.

These prices are converted into local currency by using exchange rate during the study period (1US\$=106Pak. Rupees). As far as the gross export margin for this market is concerned, it finds Rs.21601.2 per ton and percent export margin is 64 percent whereas net export margin is Rs. 8583.294 per ton which accounts for 25 percent export margin in UAE's market.

Table 6: Factors affecting Kinnow exports from Pakistan to UAE.

Variables	Coefficient	Std. error	T-value	Prob.
Constant	208994.670	38554.446	5.421	0.000
Age of exporter (years)	-906.636	401.713	-2.257	0.035
Experience of exporter (years)	178.961	399.877	.448	0.659
Education (Schooling years)	615.476	1702.741	.361	0.721
Processing cost (Rs./Ton)	-148.579	279.190	-.532	0.600
Packing cost (Rs./Ton)	-1159.851	1178.319	-.984	0.336
Freight charges (Rs./Ton)	-1945.897	414.873	-4.690	0.000
International price(Rs./Ton)	182.995	51.324	3.565	0.002
Domestic price (Rs./Ton)	-1175.480	323.395	-3.635	0.002
R ²			0.728	
Adjusted R ²			0.624	
F-value			7.026	

Sources: Author's own calculation.

UAE market has potential for Pakistani agricultural products. Another study (Javed et al., 2015) concluded that there was 24 percent export margin in case of basmati exports to United Arab Emirates. Which is comparatively low as compared to the Kinnow which is calculated as 25 percent in the current study. The multicollinearity situation among independent variables in the analysis factors affecting Pakistan's kinnow export to UAE is shown in Table 5.

In analysis, all the values of VIF shown are less than 10 which shows that multicollinearity does not exist in the data set. To estimate the impact of different factors on kinnow exports from Pakistan Equation 2 is used for the analysis. Measure of the closeness of fit in a regression modal is R² called coefficient of determination. The value of R² lie between 0-1, measure the proportion variation that explained by explanatory variables. The value in the analysis was 0.728 which show that all independent variables jointly explained 0.728 percent change in Kinnow export to UAE. F ratio shows the overall significant of the model as given in Table 6.

The impact of different factors on kinnow exports from Pakistan to UAE is given in Table 6. According to the result of the study the age of exporter has negative and significant relation with export quantity of kinnow to UAE market. Freight charges and domestic price of kinnow has significant and negative impact on export quantity of kinnow exports from Pakistan to UAE market. International price has positive and significant impact on export of kinnow from Pakistan to United Arab Emirates. Other variables of experience of

exporter, education of exporter, processing cost and packing cost has insignificant relation with kinnow export quantity to United Arab Emirates.

Conclusions and Recommendations

According to the finding, gross export margin for USA market is Rs. 30644 per Ton and percent export margin is 70 percent while Net export margin is found as Rs. 14076.074 per ton. While in case of UAE market, Gross export margin is estimated as Rs.21601.2 per ton. For the Market of UAE, percent export margin is 64 percent whereas net export margin is Rs. 8583.294 per ton. According to the results the USA market has more next export margin which is 29 percent as compared to UAE market which is 25 percent. In case of factors affecting the kinnow export to USA, the coefficient of education is 0.124, which shows positive and significant impact of education on kinnow export from Pakistan to USA. The coefficient of packing cost is -0.039 that shows negative but highly significant effect. The coefficient of international sale price was 0.003 that showed positive sign and highly significant. In case of factor affecting the kinnow exports to UAE, The coefficient of age of exporter is positive and highly significant. The coefficient of exporter's experience is 178.961 that significantly affect the kinnow export of Pakistan. The coefficient of freight charges is -1945.897 that shows negative signs but highly significant. The coefficient of international sale price is 182.995 that shows positive sign and significant. The coefficient of domestic price is -1175.480 that show negative but highly significant. It is particularly stiff competition

in international markets so governments of Pakistan should assess the challenges the kinnow exporter currently confronted with. Pakistani kinnow is sold in international market due to its cheaper price, due to devaluation of currencies of our competitors. There are also other factors which affect export of kinnow from Pakistan. These include increasing cost of production, standards of importing countries, lack of brands and labels in the kinnow sector of Pakistan. Government should initiate any concrete step to resolve issues that confronting our exporter in international market. All Pakistan Fruit and Vegetable Association (PFVA) should come ahead and encourage the exporters. Instead of short term plan "seasonal gain," long term plan as visionary plan should be given preference. Otherwise Pakistan faces a crisis when it comes to Kinnow exports.

Author's Contribution

Shumail Nazeer: Collection of data, analysis and preparation of first draft.

Iqbal Javed: Conceptual framework and analysis.

Allah Bakhsh: Explanation of results and discussion.

Mudassar Yasin: Conclusion and editing.

Haroon Javaid: Editing of part of market margins and revision.

Kaniz Fatima: Revisions of results and discussion according to review of literature and objectives of the study.

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