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Impact of Product Quality on Export Flows: A Firm-Level Analysis of Pakistan

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ABSTRACT

Purpose- This study focuses on examining the connection between product quality and export flow at the firm level of Pakistan as high-quality products play an important role in raising domestic as well as foreign sales.

Design/methodology/approach- It uses unbalanced panel data for non-financial firms that are listed on the Pakistan Stock Exchange. The Fixed Effect Model is used as an estimation technique for the period of years 1999-2019.

Findings- The study reveals that product quality plays a significant role in to increase of all types of sales such as local sales, export sales, and total sales. Product quality has a direct and strong impact on a firm's sales at both domestic and international levels. Our results are robust having incorporated two dummies for size and entry in the model.

Originality/Value- This study contributes to the previous studies by analyzing the role of product quality in determining the export flow of an economy. These findings can help policymakers in the implementation of such measures and processes through which the producer and investor m can increase its product quality such as the provision of R&D funds and financial aid programs for new investors.

Keywords: Trade flows; Economic Globalization; Product Quality.

1. INTRODUCTION

The concept of trade openness is developed when the process of globalization is beginning. Trade openness is beneficial if the country has a strong business relationship with other trading partners. Export promotion activities can play a significant role in strengthening these relations by increasing the export flow of an economy. The quality of the product is very important which is being exported to other neighbouring countries.

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Product quality is an essential aspect of exports of a country. The production process of high-quality exports leads to an improved trade balance. But, a low-quality firm is unable to get market access in the international market (Amiti & Khandelwal, 2013; Fan & Li, 2015). The developing countries produce low-quality products as their resource availability is limited which lowers their exports flow over time. On the other side, developed countries produce high-quality products and they have easy access to the international market, which ultimately improves the export flows. And, high-quality product lowers the effect of high cost including (production, promotion, and transportation cost) as they can be decreased as the demand (Hummels & Klenow, 2005). Hence, it argued that only products of good quality are more likely to be exported profitably.

A few studies (Qi et al., 2018) pinpointed the role of export flows on the product quality and productivity of a firm. These studies presented some channels through which a firm can enhance exports by improving product quality and the productivity of its resources.

Linder (1961) was the pioneer economist who has given the idea of product quality in international trade theory. According to theory, the country with high income per capita should put more focus on producing good quality products as they have financial space to spend in the production process. Hence, rich countries can get more comparative advantage by the production of high-quality goods and highly demanded products in the domestic market. The Linder term measures the dissimilarity between the per capita income levels of two countries. Some recent studies by Helpman et al. (2004), Alcala (2016), Piveteau & Smagghue (2017), and Crino & Ogliari (2015) have developed a theoretical framework in the general equilibrium modeling based on Linder's theory. These frameworks have many implications which highlighted the impact of trade liberalization. Thus, Linder relates the domestic market to international markets.

The evidence on the relationship between product quality and international trade indicates that the matter of product quality in foreign markets significantly fluctuates

across the nations (Linder, 1961; Flam & Helpman, 1987; Crino & Epifani, 2012)¹. On the one side, the production of high-quality products creates a good reputation and confidence for producers in the overall market. But on the other side, such goods require higher costs of production. According to the literature on international trade, only those firms that are more productive can produce higher-quality products, which yield higher export prices. High-quality products can increase the sale of a product which ultimately earns more revenue. Firms can enter and then survive in foreign markets by upgrading their product quality (Manova & Yu, 2017). For instance, the role of product quality in international trade is explained first time by Linder (1961). Krugman (1995) argued that higher-income countries produced a greater variety of goods. The high income countries can sell more units of goods than poor countries (Schott, 2004; Hummels & Klenow, 2005; Hallak & Schott, 2008). Firms with high export product quality lead to larger market shares and self-selection into the international market instead of charging higher prices.

Many studies on the influence of product quality and international trade flows suggested that there is a direct relationship between high export product quality and trade flows (Linder, 1961; Faruq, 2006; Gervais, 2015; Alcala, 2016; Henn et al., 2020). Some recent studies (Schott, 2004; Hallak & Schott, 2008) highlight the importance of product quality in foreign trade. However, the effect of product quality on the gain from trade flow is not investigated at its full length. Few studies on Pakistani firms have investigated the trade flow (Wadho & Chaudhry, 2018; Rashid et al., 2021) but no one can make the connection between trade flow with product quality. Consequently, there is no study on the relationship between product quality and the export flow of Pakistan. The main aim of this study is to investigate the nature and magnitude of the relationship between product quality and the trade flow of Pakistan at the firm level.

Among others, the one major issue in Pakistan's economy which become very serious is the increasing trend in the trade deficit over time. The one root cause of this deficit is product quality that is not up to international criteria. Hence, to solve this problem, the focus should be on the improvement of the product quality. In this context, the recent

¹ These studies were used to export data on goods produced in different countries and industries to determine the average quality of that product.

study should prove helpful to solve this issue. The study aims to examine the following objective to empirically examine the impact of export product quality on trade flows at the firm level in the case of Pakistan. The remaining paper is arranged as follows. Section 2 describes the reviewed theoretical literature and section 3 explains the theoretical framework, variables description, data sources, and estimation techniques. Section 4 discusses the findings and their interpretation in detail and Section 5 presents the conclusion of the analysis.

2. LITERATURE REVIEW

Several studies have analyzed the relationship between product quality and trade flows. The role of Product quality is very important in enhancing business activities at the international level (Saudi et al., 2019). It's. There is a mediation role of product quality which determines the performance of a firm at the national and international level (Calantone & Knight, 2000). In recent studies, researchers focused on the impact of trade volume on product diversification (Fang et al., 2019). Hummels & Klenow (2005) and Hallak & Sivadasan (2013) found that larger countries have large trade shares and large trade surpluses by offering high export product quality. Such type of product diversification is beneficial for developing countries as more varieties of products in an export basket can help the countries grow speedily. The firm producing a good quality product can participate in the international market successfully. Higher product quality provides better opportunities for firms to be successful in the exporting market although productivity is not similar (Aw & Lee, 2017; Fang et al., 2019; Can et al., 2020). Many factors affect the trade flow and export product quality such as the productivity of firms, skilled workers, economic conditions, R&D activities, trade liberalization, tariff rate, exchange rate, and per capita income (Copeland & Kotwal, 1996; Hallak & Schott, 2008; Yu, 2013; Gervais, 2015; Hung & Peng, 2020). The export product quality plays an important role in choosing trading partners, as China has considered Thailand as a high-product quality importer. Alcalá (2016) found that the export quality of a country can increase if those countries have a comparative advantage in their trade. A country's environment also affects the export product quality, especially for developing countries.

(Fan et al., 2015; Can et al., 2020). The developed countries exchange high-quality products with developing countries and boost the growth rate of exports. The tendency to export varied with export product quality. The low intensity for an export country produced low quality and high-intensity export sold high quality (Brooks, 2006; Curzi & Olper, 2012; Fałkowski et al., 2016; Lin et al., 2018).

The above literature has summarized the link between trade flow with product quality. Export promotion activities lead toward the economic development of a country. There is a positive and direct relationship exists between trading activities and trade flow. As high-quality products are more likely to be exported at the international level.

3. RESEARCH METHODOLOGY

This study is based on a theoretical model which is developed by Crino and Ogliari (2017) enables us to investigate empirically how financial imperfection affects the average quality of good produce and hence creates trade imbalances. The main assumptions regarding firms' decisions about quality may be fixed in some cases for analytical convenience, as they argue that the quality choice is an independent matter with respect to destinations, thereby quality decisions are ruled out across markets. The model for financial friction and financial vulnerability is mainly based on Manova (2013). The firm's decisions of entry into the destination and the quality of the product sold therein are illustrated graphically. Two margins are highlighted for product quality. Firstly the extensive margin that intimates the firm's selection of market i which is directed by the exporting cut-off. Secondly, the intensive margin shows the average quality of new exporters' products which come through the portion of liquidity-constrained and unconstrained firms.

The empirical model is based on the theoretical model developed by Crino and Ogliari (2017). This model is estimated to check the link between export quality on trade flows.

$$EF_{ft} = \alpha_0 + \alpha_1 PQ_{ft} + \alpha_2' z_{1t} + \mu_i + \lambda_t + e_{i,t} \quad (1)$$

where is the export flows of the firm, PQ_{ft} is the export product quality of a firm, and

z_{1t} is the vector of firm-specific control variables. And the coefficient shows the direct impact of product quality on the trade flows of an economy. Where λ_t and μ_t are firm-specific and time-specific non-stochastic effects.

After the data collection and variables construction², the variable of product quality is measured through the methodology presented by (Manova & Yu, 2017). Afterward, the fixed effect model is used to explore the link between product quality and trade flows³.

3.1. Variable Description and Data Sources

The sample is collected from the Pakistan Stock Exchange (PSX). The data is taken from the annual financial reports of non-financial firms for the period of 1999 to 2019. These firms are chosen to meet the accounting criteria consistent with the objectives of the study. The macro-level variables are collected from different data sources like the Pakistan Economic Survey, Pakistan Bureau of Statistics, International Financial Statistics, and World Development Indices.

Table 1

Variables Construction and Their Sources

Dependent Variable	Product Quality	Author's Construction using the methodology of Manova and Yu (2017)
Independent Variables	Local Sale	AFS of the Pakistan Stock Exchange
	Export Sale	
	Total Sale	
	Size Dummy	Large Size=1, Small Size=0
	Entry Dummy	Entre into Foreign Market=1, Entre into Domestic Market=0
Control Variables	Foreign Direct Investment	World Development Indicators (WDI)
	Trade Flow	
	Total Assets	AFS of the Pakistan Stock Exchange

² The normalization process is done for few variables due to different unit of measurement and the min-max method of OECD (2008) is adopted for this purpose.

³ The Hausman test is applied as diagnostic test which suggest that the fixed effect model is more appropriate.

4. RESULTS AND ANALYSIS

The empirical outcome of the study presents that three types of analysis are done to check robustness: Descriptive analysis, Graphical analysis, and Empirical analysis.

4.1. Descriptive Analysis

Table 2 explains the summary statistics whereas Table 3 provides a correlation matrix of product quality and export flow.

Table 2

Summary Statistics of Product Quality and Export Flow

<i>Variables</i>	<i>No of obs.</i>	<i>Median</i>	<i>St Dev.</i>	<i>Min</i>	<i>Max</i>	<i>p25</i>	<i>p50 (Median)</i>	<i>p75</i>
PQ_{ft}	6877	60.45	12.59	0	100	53	60	68
SAL_{ft}	6880	111.92	40.68	141.78	131.90	66.51	185.18	544.89
LS_{ft}	6820	113.24	53.45	0	111.92	53.15	144.02	438.16
ES_{ft}	3195	205.50	43.05	0.00	92.93	54.76	508.13	997.19
FDI_t	7380	-19.14	14.86	-54.92	-29.70	-23.55	-17.03	-78.85
TF_t	5535	5.90	2.05	1.63	8.68	4.47	5.97	7.97
TA_{ft}	6783	9.39	4.79	0	100	8	8	9

Table 2 gives us the summary statistics as the number of observations, mean, median, minimum value, and maximum value. The percentile values at 25th, 50th, and 75th levels indicate the low, medium, and high values of variables. The value of the standard variable is low which shows there is less variation in all variables except export sales, local sales, and total sales. Here, PQ_{ft} , SAL_{ft} , LS_{ft} , and ES_{ft} are product quality, total sales, local sales, and export sales respectively. However, there are two control variables used at the country level: foreign direct investment (FDI_{ft}) and Trade flow (TF_{ft}), and one control variable from the firm level is used which is a total asset (TA_{ft}). Table 3 provides a correlation matrix between export flow and product quality.

Table 3*Correlation Matrix of Export Flows and Product Quality*

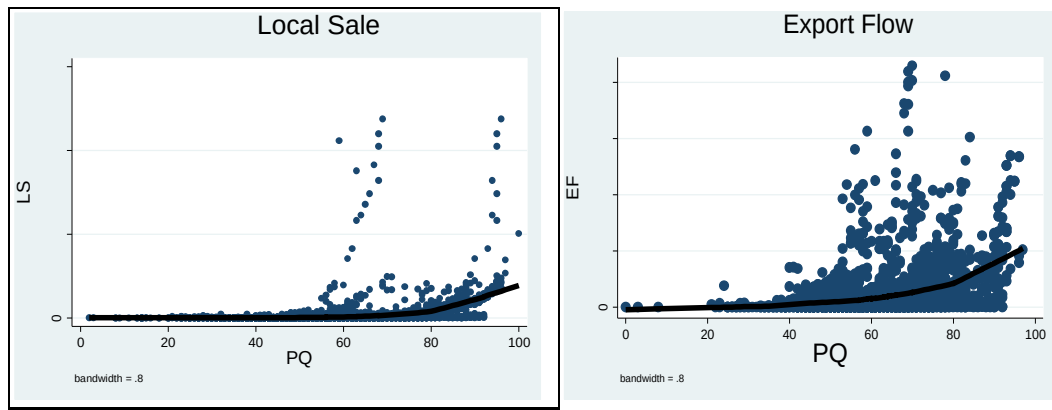
1	PQ_{ft}	SAL_{ft}	LS_{ft}	ES_{ft}	FDI_t	TF_t	TA_{ft}
PQ_{ft}	1.00						
SAL_{ft}	0.63	1.00					
LS_{ft}	0.46	0.59	1.00				
ES_{ft}	0.31	0.29	0.38	1.00			
FDI_t	0.00	0.01	0.01	0.04	1.00		
TF_t	0.01	0.02	-0.05	0.01	0.44	1.00	
TA_{ft}	0.42	0.51	0.66	0.45	0.00	0.07	1.00

Table 3 presents the correlation between all types of sales with product quality. The findings show that all variables like PQ_{ft} , SAL_{ft} , LS_{ft} , ES_{ft} , FDI_{ft} , TF_{ft} , and Ta_{ft} are positively related to all other variables except the correlation of LS_{ft} and TF_{ft} . After presenting the descriptive analysis of export flow, the graphical analysis explains all types of sales with product quality.

4.2. Graphical Analysis

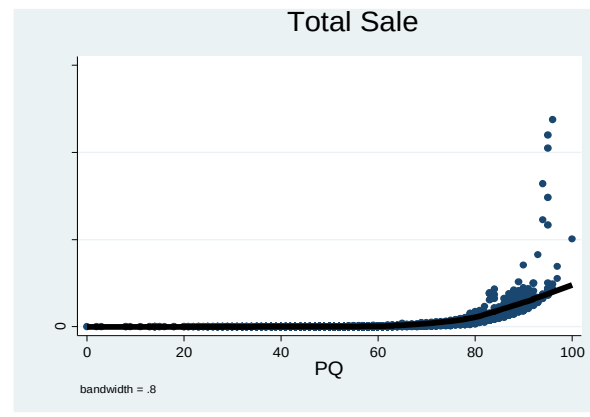
The graphical analysis was done for export sales, local sales, and total sales. Figure 1 plots all sales and product quality. On the horizontal axis, product quality is taken while all type of sales at the firm level is kept on the vertical axis.

Figure 1*Scatter Plot for Product Quality and Local Sales*



a). Local Sale

b). Export Sale



This graphical analysis shows a positive and significant relationship between product quality and all types of local, export, and total sales. Good quality products are more attractive to local and foreign customers. So ultimately demand and sale increases for a good quality product in both markets. Consequently, the trade flows of a country can also increase.

4.3. Empirical Analysis

After descriptive and graphical analysis, the empirical analysis is also done by using three control variables⁴. The estimation was carried out with a fixed-effect model using

⁴Two variables of macro side are FDI and Trade Flow, and one variable from the firm level is Total Assets.

the Hausman test⁵. Table 4 describes the estimated results of our empirical model (Equation 1) whereas the dependent variable is different types of sales.

Table 4

The Relationship between Product Quality and All Types of Sale

Variables	ES_{ft} Model (1)	LS_{ft} Model (2)	TS_{ft} Model (3)
PQ_{ft}	11.54*** (0.000)	5.27** (0.046)	10.88*** (0.000)
FDI_t	0.02*** (0.000)	0.04** (0.009)	0.06*** (0.000)
TA_{ft}	9.63*** (0.005)	4.13* (0.059)	14.31** (0.010)
TF_t	8.12*** (0.000)	4.53 (0.277)	6.52 (0.655)
Const.	-138.11*** (0.000)	-68.44*** (0.000)	-66.63*** (0.000)
Obs.	3101	6601	6659
R – Squared	0.24	0.24	0.26
No. of Firms	258	360	360
F. Stat.	17.62*** (0.000)	27.11*** (0.000)	20.47*** (0.000)

Note: Where ES_{ft} is used for export sales, LS_{ft} is for local sales, and TS_{ft} is for the total sales. The notations ***, **, and * are significant at 1, 5, and 10 percent respectively. In parentheses, P-values are presented.

Our results indicated that there is a positive link between product quality and export, local, and total sales. The estimated results show that product quality has a positive and significant effect on all types of sales: export sales, local sales, and total sales. The results indicate that a firm can increase its sales with an increase in its product quality. So, it is also helpful in generating positive revenue and profit at the firm level. In an open side economy, the firm can enter a foreign market and compete with international standards by producing high-quality products. It means that product quality is not only important for domestic sales as well as for export sales. Hence, high product quality leads to an increase in local sales, export sales, and ultimately total sales. Our results are consistent with the studies of Hummels & Klenow (2005), Verhoogen (2008), Can et al. (2020), and Fang et al. (2019) which investigated the positive correlation between export flow and

⁵Hausman test statistics (22.78) with a p-value(0.000).

product quality. The control variables FD_{it} , TF_{it} , and TA_{it} also positively and significantly affect export flow. Next, we highlighted the impact of firm size on all types of sales. We generated dummies for large and small firms respectively. Table 5 shows the outcome of empirical model 9 when the effect of the size dummy is included in the analysis. This analysis is done for a robustness check.

Table 5*Product Quality and Trade Flow (Size Dummy)*

Variables	ES_{ft}		LS_{ft}		TS_{ft}	
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
PQ_{ft}	11.52*** (0.000)	10.55** (0.000)	5.12 (0.046)	4.3598* (0.060)	10.8364** * (0.000)	88.4951*** (0.000)
Size dummy	----	5.89** (0.022)	----	4.54 (0.110)	----	11.7528*** (0.0000)
FDI_t	0.02*** (0.000)	0.02** (0.012)	0.04** (0.009)	0.06*** (0.000)	0.0672*** (0.000)	0.0672*** (0.000)
TA_{ft}	9.63*** (0.005)	6.94*** (0.008)	4.13* (0.059)	14.31* (0.010)	14.3116** (0.010)	14.3116** (0.010)
TF_t	8.12*** (0.000)	8.48*** (0.000)	4.53 (0.277)	6.52 (0.655)	6.5227 (0.655)	6.5227 (0.655)
Const.	- 138.11*** (0.000)	- 133.17*** (0.000)	-68.44 *** (0.000)	-66.63*** (0.000)	- 66.6321** * (0.000)	- 66.6321*** (0.000)
Obs.	3101	3101	6601	6659	6659	6659
R – Squared	0.24	0.25	0.24	0.26	0.26	0.26
No. of Firms	258	258	360	360	360	360
F. Stat.	17.62*** (0.000)	16.26*** (0.000)	27.11*** (0.000)	20.47*** (0.000)	20.47*** (0.000)	20.47*** (0.000)

Note: As follows Table 4 when incorporating the effect of the size dummy.

Table 5 shows the outcome of an empirical model (1) when a dummy for firm size is included. The firm's size is a very important indicator to analyze the firm performance. The more productive firm is more likely to increase its sales and become a large size firm. A large firm in size has more chance to enter and survive in the export market. When we included a dummy for size in the model, the result highlighted that firm size is also positively affected by all types of sales. The coefficient of the size dummy has a positive and significant effect on export sales and total sales. Meanwhile, the size dummy

for local sales is positive but insignificant which implies that firm size is not important for local sales as small firms also run their business in the local market. Our results are consistent with the studies of Bernard & Jensen (1999). The trade flow has no significant effect on the local market. One more important dummy for entry into the export market is also constructed to check the strength of the relationship between product quality and trade flow. Table 6 shows the outcome of model 9 after including the effect of the size dummy in the analysis.

Table 6

Product Quality and Trade Flow (Entry Dummy)

Variables	ES_{ft}		LS_{ft}		TS_{ft}	
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
PQ_{ft}	11.5241*** (0.000)	7.9832*** (0.004)	5.12* (0.046)	51.23** (0.046)	10.83*** (0.000)	10.81*** (0.000)
Entry dummy	-----	2.4248*** (0.000)	-----	2.53 (0.130)	-----	1.58*** (0.001)
FDI_t	0.0212*** (0.000)	0.0164*** (0.000)	0.04** (0.009)	0.04** (0.009)	0.06*** (0.000)	0.06** (0.017)
TA_{ft}	9.6372*** (0.005)	661.5683** * (0.001)	4.13* (0.059)	4.31** (0.059)	14.31** (0.010)	14.34*** (0.003)
TF_t	8.1253*** (0.000)	6.7521*** (0.000)	4.53 (0.277)	2.84 (0.279)	6.52 (0.655)	7.06 (0.514)
Const.	- 13.8112*** (0.000)	-11.4613*** (0.000)	-68.44*** (0.000)	-67.17** (0.000)	- 66.63*** (0.000)	-70.26*** (0.000)
Obs.	3101	3101	6601	6601	6659	6659
R – Squared	0.24	0.27	0.24	0.24	0.26	0.30
No. of Firms	258	258	360	360	360	360
F. Stat.	17.62*** (0.000)	42.20*** (0.000)	27.11*** (0.000)	21.69*** (0.000)	20.47*** (0.000)	16.65*** (0.000)

Note: As follows Table 4 when incorporating the effect of the entry dummy. Significance at 1, 5, and 10 percent are denoted by ***, **, and * respectively. P-values of individual coefficients are presented in parentheses.

Table 6 shows the results of the empirical model (1) after incorporating the effect of the entry dummy. Model (2), Model (4), and Model (6) are estimated by including an entry dummy in the baseline models the results reveal that the coefficient of the entry

dummy (2.42) for export sales and total sales is also positive and significant. It implies that when a firm wants to enter the export market, a firm pays more attention to increasing its sales at both local and domestic levels and the sales can increase by improving the quality of the product. Whereas the effect of the entry dummy is meaningless for local sales. Our results are consistent with the study of Bernard et al. (2012). At the initial stage, the firm's focus is to set its business at the local level with small investments. However, over time, the firm starts investing in larger projects by generating high revenue, and therefore firm's size increases. The coefficients of control variables are like the results of Table 5.

5. CONCLUSION

The export flows of a country are determined by the quality of the product. The Firms producing products of high quality should acquire the benefits from both local and international markets. In this context, our study is an effort to examine the impact of product quality on the export flows of Pakistan's firms. By constructing the product quality through the methodology of Manova and Yu, (2017), the objective of the study is to find how product quality can affect the export flow of Pakistan. In this context, sales at the firm level are categorized as total sales, local sales, and export sales. The findings of the study reveal that product quality plays an important role in the increase of all types of sales. In all cases, the positive and significant estimates of product quality explain that better quality of the product enhances the firm's sales at both domestic and international levels. Our results are robust having incorporated two dummies for size and entry in the model. Estimated results reveal that the size of a firm positively and significantly affects the export sales and total sales, however, the size of a firm does not signify its impact on local sales. In addition, the positive and significant coefficient of entry explains that the decision to enter is important for a firm that is productive and produces high-quality products which indicates that a firm can expand its business and enter into the export market by improving the quality of its product. Product quality is important for domestic as well as foreign producers. The improvement in product quality can lead to increased domestic sales and export flow at the firm level. In the case of Pakistan, improvement in

export flow is a fundamental need for economic development. The country may put more focus on adopting such measures and processes through which a firm can improve its product quality. The government should provide a loan with the least interest payments and R&D funds for new investors to increase their sales. There should be financial aid programs provided at the firm level to cover the high cost of improving the quality of the product.

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