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Determinants of Jute Export Demand: An Empirical Investigation on Bangladesh

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This paper investigates the export demand of jute and jute goods of Bangladesh. Following trade literature, a conventional export demand equation is specified for jute export demand of Bangladesh. GDP of trade partner country and Export Unit Value Index*[1] (EVI) of Bangladesh are considered as income and price variables respectively. For estimating purposes we only considered five top countries, USA, UK, Belgium, Germany and Australia, where Bangladesh exports more. The regression result shows that income of USA and Australia are only significant determinant of Bangladeshi jute exports. Moreover, export price is also not found significant determinant in case of Bangladeshi jute goods export. Policy implication of these findings are Bangladeshi exporters should not rely on to the traditional markets only. Government should come forward and disseminate information to exporters about market, barriers to be faced, and advantages in a particular market.

*[1] Export unit value index measures changes in export price level against a base year. This price index calculates average changes in value where a bundle of heterogeneous units are there.

Keywords: Jute Export Demand, Determinants of Jute Export, Jute Export, Jute Export of Bangladesh

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Introduction

Jute is one of the important vegetable fibers of Bangladesh, popularly known as golden fiber. Considering the areas under cultivation Bangladesh is the second-largest jute producing country in the world (FAOa, n.d.). It is also the leading jute goods-producing country in the world (Gupta et al., 2009). Hessian, sacks, different kinds of bags, carpets, and different handicrafts are produced and exported from Bangladesh, which is around 75 percent of total global exports of raw jute and jute goods (Index Box, 2019). Moreover, environmental aspects of jute create the market potential for jute and jute goods. However, exports of jute and jute goods from Bangladesh decreased by 8 percent annually from 2007 to 2018 which was filled by some other competitive countries export growth (Index Box, 2019). Thus, when we have potential to export increase, our export is decreasing. Therefore, the jute export demand analysis is required for Bangladesh that will give us an understanding of the dynamics of export. Hence, the objective of this research is to explore the export demand of jute and jute goods of Bangladesh.

The organization of this paper is as follows. First, the relevant literature is discussed. Then, from this literature, a jute export demand function is identified for Bangladesh. The data and its stationarity check is discussed next. Then, the results of the study are discussed. And finally, the conclusion and eventual policy implications are discussed. The paper concentrates more on the empirical side, discussion on the theory of export demand and effects of different factors are not the matter of this research.

Literature Review

In the literature, research on several aspects of jute are found. First and foremost group of literature are related with the production aspects of jute in Bangladesh (Gupta et. al., 2009; Islam and Aladdin, 2012; Ghosh and Jethi, 2013; Uddin et al., 2014, Rahman et al., 2017; Islam and Ali, 2018). It is found that around 12.5 percent of total farmers are engaged in jute cultivation in Bangladesh (Islam and Ali, 2018).

The profitability of jute production is more than that of its main alternative crop Aus rice (Molla et al., 2015).

Although Bangladesh is one of the major jute-producing countries in the World, total production and yield is decreasing but still second in position in the World (Gupta et al., 2009; Islam and Aladdin, 2012). World jute production has decreased considerably in the period of 1992-2010 in comparison to the period of 1970-1991 (Ghosh and Jethi, 2013). Even the recent forecast for the production of jute is also in the same direction for Bangladesh (Hossain and Abdulla, 2012). However, Rahman et al. (2017) in their empirical research found that there is the scope of production efficiency in Bangladesh. They argued that improvement in research, irrigation, tenurial reform, and export protection for jute can boost export earnings.

The second group of literature is related with different aspects of production of jute goods and its exports (Islam and Ali, 2018; Rahman and Khalid, 2011; de Vries, 2007; Uddin et al., 2014; Aktar, 2015). Islam and Ali (2018) found that there are total 192 jute mills in Bangladesh in which around 1.7 lac workers are directly involved. The raw jute and jute goods are consumed locally as well as export. Bangladesh and India are the top two leaders in the global jute export (Ghosh and Jethi, 2013). However, Rahman and Khalid (2011) found that jute and jute goods export of Bangladesh are fluctuating. In this respect, de Vries (2007) analyzed market potential of Bangladeshi jute products into Europe using SWOT (Strength, Weaknesses, Opportunities and Threats) analysis. Similarly, Aktar (2015) studied market potentials for Bangladeshi jute products in the Australian market. All these studies argued about further market opportunities for Bangladeshi jute products, but they did not provide any empirical analysis on the demand of Bangladeshi jute goods and their determinants in those markets.

Exports is an important factors that affect the growth of a country. Goldstein and Khan (1982) argued that export will affect growth more, when the income elasticity of the export demand is more. They also suggest that exports of a country will be more competitive in the world market when the price elasticity is high. However, in the literature export demand analysis for jute is very limited.

The only study related to this found is Mujeri(1978)

Where he empirically analysed the international market for jute and jute goods. Estimating simultaneous equation model it tried to find out the dynamic aspects of the market. It found the factors that affect the variability of the world jute prices. Analyzing both supply and demand side factors, this research also found that in supply side producers are very responsive to those factors and similarly in the demand side net consumption demand are widely varies for country to country. Therefore, although this study analyzed the international market for jute goods, it did not analyze the export demand for a particular country.

Finally, a group of literature is there where export demand in general, not for a specific goods is analysed. For example, Senhadji and Montenegro (1999) analysed export demand in general for 53 industrial and developing countries. Similarly, Serrano and Pinilla (2010) analysed the reason of increase in international trade related to agricultural goods for the period of 1951-2000 from demand perspective. On the contrary, Narayan & Narayan (2004) and Hossain (2009) empirically estimated the export demand for a specific country, Fiji and Indonesia respectively. Similar types of research done by Kabir (1988), though he estimated both import and export demand for Bangladesh. In Senhadji and Montenegro's (1999) export demand equation the dependent variable is the real exports of home country and the explanatory variables are the relative export price with respect to competitors and the differences of real export from real GDP of the trading partners. Although they found the expected positive sign for both the variables but the values are different for different countries.

However, Serrano and Pinilla (2010) found that principal determinant of the increase in international trade on agricultural goods is income growth whereas. They also found that the stable exchange rate and the price has only a small role here. On the other hand, both Narayan & Narayan (2004) and Hossain (2009) found that the foreign economic activity and competitors price are positive whereas own price have negative impacts on real exports of Fiji and Indonesia respectively.

From the above discussion, it is found that export demand analysis for a specific country as well as for a specific good, especially is very limited.

To the best of our knowledge, there is no empirical study on Bangladesh's jute export demand. However, it is crucial to know the causal factors of exports for policy perspective as exports can influence growth and development. Therefore, this research will not only add to the knowledge of export demand analysis for developing countries but also for Bangladesh's jute export demand literature.

Methodology and Data

A) Model Specification

Following the trade literature (Kabir, 1988; Narayan and Narayan, 2004; Hossain, 2009), it is assumed that Bangladesh's jute exports is determined by the demand. Moreover, this export demand function is positively related with trading partner country's income and negatively related with export price. Here, GDP of trade partner country and Export Unit Value Index*[2] (EVI) of Bangladesh are considered as income and price variables respectively. Bangladesh exports jute and jute goods in several countries in the world. However, for estimating purpose we only considered five top countries where Bangladesh exports more. These countries are USA, UK, Belgium, Germany and Australia. Therefore, for estimating purposes, the export demand equation for Bangladesh's jute is specified as:

Insert equation 1 and its interpretation

*[2] Export unit value index is a price index that measures average value changes in heterogeneous cluster of units.

B) Data

For the estimation purposes data used here is collected from different sources for the year 1991-2018. Export value of jute is collected from Export Promotion Bureau of Bangladesh (EPB, 2019). As export value of jute total export value of raw jute and jute goods are considered. GDP of USA, UK, Belgium, Germany and Australia are collected from FAO statistics (FAOb, n.d.). EVI data is collected from UNCTAD and WITS (World Integrated Trade Solution*[3]) where the year 2000 is considered as base year (UNCTAD, n.d.).

*[3] World Integrated Trade

Solution (WITS) is developed by World Bank and the United Nations Conference on Trade and Development (UNCTAD) in consultation with International Trade Center, United Nations Statistical Division (UNSD) and the World Trade Organization (WTO).

Stationarity Check Before going to use any formal test we just plot the time series data under this study. Figure 1 shows such plots where we can clearly see some trends in the variables. Thus, the variables are non-stationary and if we use them directly, we would get a spurious regression (Gujarati et al., 2019).

Insert Figure 1: GDP of five countries

Stationarity properties for the variables are tested here by using the Augmented Dickey-Fuller Test (Basic Econometrics, Gujarati, 2019). The test results are shown in Table 2.

Insert Table 1: Unit root test

The above table 1 shows the result of different variables and their respective random walk models with drift and without drift as well as indicates whether it is stationary or non-stationary at their initial level. In the above table, the sign indicates the first difference. It is found that most variables are non-stationary at their initial level. However, after taking the first difference it becomes stationary.

Empirical Findings and Discussions

In the Table 2 empirical findings are presented based on our jute export demand model shown in equation (1). As all the variables are $I(1)$ so we use the first difference of all the variables to avoid spurious regression. The results of the estimate is very interesting, though not all variables are found significant. The regression result shows that the coefficients of GDP is significant for the USA and Australia only. However, expected sign for both of them are not the same. The commonly held belief is that the export demand is positively responsive to partner countries GDP. The findings of this research supports that this belief is true for only Australia in relation to Bangladeshi jute and jute goods. Therefore, findings of this research suggest Bangladeshi jute and jute goods demand is positively responsive to the increase in Australian GDP. Akter (2015) has argued similarly that there is huge potential of Bangladeshi jute goods in Australian market. On the contrary, export demand is negatively related with GDP of USA.

It may be because of fancy, fashionable and quality substitutes are capturing the market.

Moreover, other technical characteristics like less impact resistance, more weight, shrink ability and not water-resistance are some major characteristics that are disfavor jute products (Rahman and Khaled, 2011).

Insert Table 2: Regression Results

Interestingly, income is not the major determinant of jute goods demand in UK, Germany and Belgium market. Some other factors like environmentally friendly character may have the effects here. A recent study also found that 96 percent Europeans believed that environment is an indisputable importance in their lives and personally they have responsibility to protect them (European Commission, 2008). Moreover, the estimated result also shows that the export price (EVI) of Bangladesh is also not significant, implies that some other non-price factors are affecting jute export demand for Bangladesh. However, export price index bears the correct negative sign in the result.

In time series data there might have multicollinearity problem. Although we have not all regression coefficients significant, our R square and *Adj-R square* is not too high indicating no multicollinearity problem here (Alhroob, Irbihat, Albashabsheh, & Javed, 2017; Husain & Javed, 2019a, 2019b; Javed, 2018; Javed, Atallah, Aldalaien, & Husain, 2019; Javed, Husain, & Ali, 2020; Javed & Azhar, 2017; Javed & Khan, 2017; Khan & Javed, 2017; Malik, Khan, Faisal, Javed, & Faridi, 2020; Rutskiy et al., 2020; Basic Econometrics, Gujarati, 2019). Moreover, normality for residual allows us to generate reliable statistical hypothesis testing. Kernel density plot of residual shown in Figure 2 indicates normality of the residuals. Therefore, from these diagnosis we may argued that empirical findings is consistent and reliable for policy purpose regarding the jute and jute goods export demand for Bangladesh.

Insert Figure 2: Normality Tests for Residuals

Conclusion

In this study, the export demand for raw jute and jute goods of Bangladesh is analysed using time series data during the period of 1991-2018.

Model is specified considering simple assumption that exports of Bangladeshi jute is an increasing function of trading partner's income and a decreasing function of export price. Total value of raw jute and jute goods exported from Bangladesh are considered as export demand of jute. GDP of partner country is considered as their income and export unite value index of Bangladesh is considered as price of Bangladeshi jute. Although, Bangladesh exports jute goods in several countries in the world, we considered here only five countries, USA, UK, Germany, Belgium and Australia where major shares of exports go.

The regression result shows that income of USA and Australia are only significant determinant of Bangladeshi jute exports. However, commonly held belief, export demand is positively responsive to partner country's income, is not found for USA here. This may be because of fancy, fashionable and quality substitute is there. Moreover, export price is also not found significant determinant in case of Bangladeshi jute goods export. This may be because of non-price factors like the technical characteristics and consumer attitudes are the more important factors than price affecting jute export demand in those countries.

The market potentials in the world market for Bangladeshi raw jute and jute products are high due to eco-friendly behavior (Uddin et al., 2014). Both product and market diversification strategy is the key to attain this opportunity. Bangladeshi exporters should not rely on to the traditional markets only. Commercial wings of Bangladeshi missions and embassies can provide information about market, barriers to be faced and advantages in a particular market in this respect. Government should come forward and disseminate these information to exporters organizing training and workshops. Government should also take initiative to invest in research and development to create new and diversified applications for jute fibers. Focus should be there in the product design to meet International requirements. In these ways, we may able to increase our jute exports that will increase our earning of foreign currencies that propelled the economic growth of Bangladesh.

Finally, we may conclude that the results of this study need to be interpreted with a little bit of caution due to some limitations of this research that may lead to future research directions.

First, this research has been limited to aggregate exports of raw jute and jute goods. Had we been able to perform a disaggregated analysis based on raw jute and jute goods (or even different jute goods like hessian, sacks, carpets etc.), at least, the significance of the study would have greatly enhanced. Secondly, the estimates of this study are based on a limited number of observations, and so, few degrees of freedom. Thirdly, non-price factors, which may affect export demand, have not been incorporated into the model. Thus, in future, research in disaggregation level with more specification can be done to have a strong conclusion regarding the jute goods export demand of Bangladesh.

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. . .

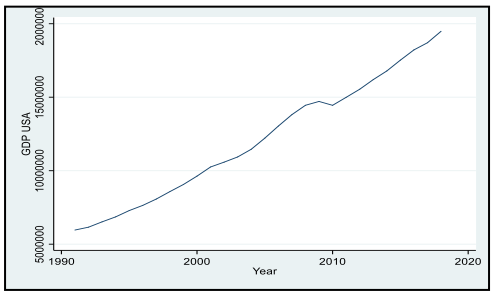
ANNEXURE 1

Insert Equation 1:

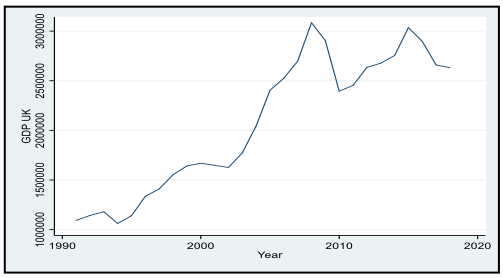
$$X_t^{BD} = \beta_0 + \beta_1 Y_t^{USA} + \beta_2 Y_t^{UK} + \beta_3 Y_t^{GER} + \beta_4 Y_t^{BEL} + \beta_5 Y_t^{AUS} + \beta_6 EVI_t^{BD} + U_t \qquad (1)$$

where X^{BD} is Bangladesh export value of jute; Y is the GDP where the superscript indicating the country as United States of America (USA), United Kingdom (UK), Germany (GER), Belgium (BEL) and Australia (AUS); EVI^{BD} is the export unit value index in Bangladesh, and U is a stochastic error term whose mean zero and variance constant. The model is closed to the standard export demand function used in trade literature (Kabir, 1988; Senhadji and Montenegro, 1999; Hossain, 2009). The coefficients of Y's are expected to have a positive sign, while that of EVI^{BD} is expected to be negative. In this model an increase in GDP of a particular country increases the demand for Bangladeshi jute there. Similarly, an increase in *EVI* decreases the export demand for Bangladeshi jute. The estimation method of the equation (1) is Ordinary Least Squares (OLS) method.

Figure 1: GDP of five countries

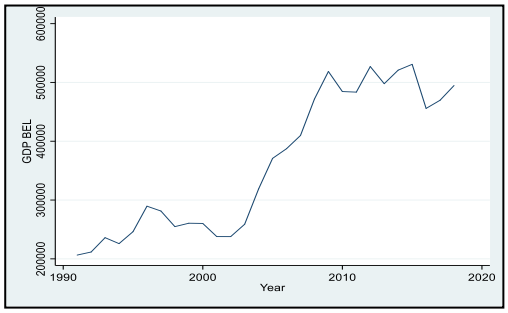


1- GDP of USA

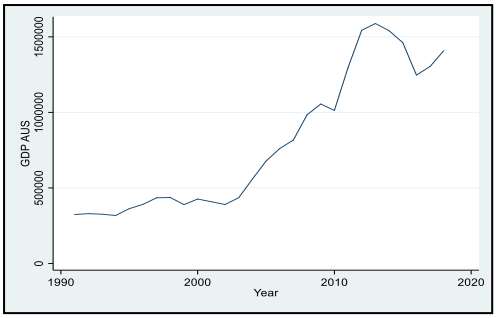


2- GDP of UK

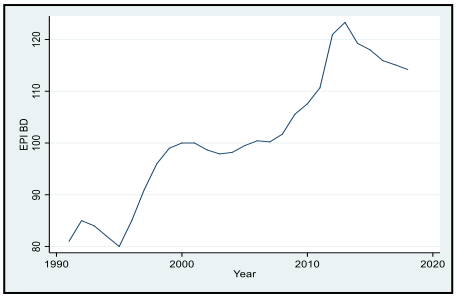
3- GDP of Germany



4- GDP of Belgium

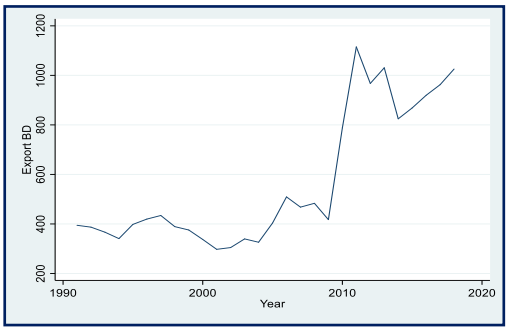


5- GDP of Australia



6- EVI of Bangladesh

Figure 2: Normality Tests for Residuals



7- Export value of Bangladesh

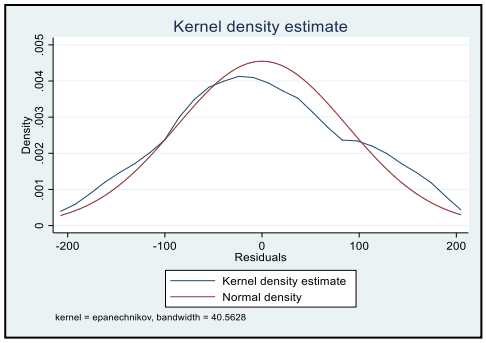


Table 1: Unit root test

Variables	Constant	Constant and Trend	Variables	Constant	Constant and Trend
X_t^{BD}	0.0268	-0.0380	ΔX_t^{BD}	-0.9223***	-0.9603***
Y_t^{USA}	0.0400***	0.0190	ΔY_t^{USA}	-0.0616	-0.587**
Y_t^{UK}	0.0187	-0.0646	ΔY_t^{UK}	-0.657***	-0.720**
Y_t^{GER}	0.0201	-0.07035	ΔY_t^{GER}	-0.9060***	-0.9794***
Y_t^{BEL}	0.0226	-0.0443	ΔY_t^{BEL}	-0.807***	-0.900***
Y_t^{AUS}	0.0369	-0.0085	ΔY_t^{AUS}	-0.533***	-0.627**
EPI_t^{BD}	0.0111	-0.0576	ΔEPI_t^{BD}	-0.4915***	-0.5545**

Note: ** and *** indicate 5% and 1% level of significance respectively. Sign Δ indicates the first difference.

Table 2: Regression Results

Dependent variable X_t^{BD}			
Variable	Coefficient	Std. Error	*t*-Statistics (*p value*)
Constant	135.2075**	64.761	2.09 (0.050)
Y_t^{USA}	-0.000216*	0.000125	-1.72 (0.101)
Y_t^{UK}	0.000047	0.000175	0.27 (0.791)
Y_t^{GER}	-0.000227	0.000425	-0.53 (0.599)
Y_t^{BEL}	-0.000747	0.00345	-0.22 (0.831)
Y_t^{AUS}	0.000855***	0.00031	2.76 (0.012)
EVI_t^{BD}	-13.3349	8.1536	-1.64 (0.118)
Model summary			
R^2		0.4172	
$Adj - R2$		0.2423	
$F - statistics$		2.39	
$Prob > F$		0.0667	

Note: *, **, and *** indicates 10%, 5% and 1% level of significance respectively; Y denotes GDP of each country and EPI denotes export unit value index of Bangladesh.