

Effects of Non-Tariff Measures on Fruit Exports from Afghanistan: A Gravity Analysis

Sahibzada, S* and Weerahewa, J¹

**Postgraduate Institute of Agriculture, University of Peradeniya, Sri Lanka*

¹ Department of Agricultural Economics and Business Management, Faculty of Agriculture, University of Peradeniya, Sri Lanka

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Introduction

Agriculture sector plays an important portion in the Afghan economy. Agricultural exports contributed to 78.24% of the total exports and 21.3% of the Gross Domestic Product (GDP) in Afghanistan in 2018. Fruits are the major exportable products among agriculture products in Afghanistan and fruit sector has been identified as one of the economic drivers in the country. Grapes, nuts, figs, and dry fruits contribute to 87% of the total earning of fruit export in the year 2018 and they contributed 57.8% of agriculture exports in 2018. The values of exports of fresh fruits have increased more than eightfold over past decade. The USA was the leading global importer of the fruits followed by Germany, Netherlands, and France, while Afghan fruits were mainly exported to India followed by Pakistan, China, Turkey, and United Arab Emirates in 2018.

Even though a reduction in average applied tariff rates for agriculture products exported from Afghanistan has been noted, the Non-Tariff Measures (NTMs)⁹ facing Afghanistan have been increasing over time. UNESCAP (2015) indicated that Afghan agricultural exports have been struggling to meet Sanitary and Phyto-Sanitary (SPS) standards abroad and suffered delays at the border owing to inefficient or inadequate inspection regimes and facilities. Empirical evidence of previous studies with respect to the effects of NTMs however are mixed. More recently, Timini and Conesa

⁹ The NTMs are defined as policy measures, other than ordinary customs tariffs, that can potentially have an economic effect on international trade in goods, changing quantities traded, or prices, or both. However, NTMs are important for health and environmental protection, such as sanitary and phyto-sanitary measures and technical barriers to trade.

(2019) showed positive effect of NTMs on Chinese exports while Sandaruwan et al (2020) showed negative effects of NTMs on seafood exports from Sri Lanka. An evaluation of effects of NTMs on export of fruits from Afghanistan hence is timely.

Objectives

The objective of this study is to determine the effect of NTMs on the export of fruits from Afghanistan.

Methodology

The gravity equation explains that the gravitational force between two countries is proportional to the product of the masses of the two countries and inversely proportional to the distance between them. The gravity model proposed by the Tinbergen (1962) was initially presented as an intuitive way of understanding international bilateral trade and over time it was extended to accommodate various other factors. The version of gravity equation used in this study is given below:

$$\ln EXP_{ijt}^p = \beta_0 + \beta_1 \ln GDP_{it} + \beta_2 \ln GDP_{jt} + \beta_3 \ln DIST_{ij} + \beta_4 COML_{ij} + \beta_5 COMB_{ij} + \beta_6 SAARC_{ij} + \beta_7 \ln(NTMTOT_{ijt}) + \epsilon_{it} \quad (1)$$

Where, EXP_{ijt}^p is the export flow of the product p from i (Afghanistan) to partner country j at time t . GDP_{it} and GDP_{jt} are the Gross Domestic Product at time t of Afghanistan and the j^{th} importing country respectively. GDP of exporting and importing countries is expected to be positively correlated with the dependent variable. The distance between Afghanistan and the j^{th} trade partner is given by $DIST_{ij}$, which is hypothesized to be negatively correlated with the fruit exports from Afghanistan. $COML_{ij}$ is for partners sharing a common language, $COMB_{ij}$ is for partners sharing a common border, is for partners in the South Asian Associate for Regional Cooperation (SAARC) and $NTMTOT_{ijt}$ refers to the NTMs. The latter three are dummy variables in the gravity equation and positive effects of such on the export of fruits from Afghanistan are expected. In the first set of specifications total number of non-tariff measures, imposed by j^{th} country on exports at time t was included and in the second set, it was treated as a dummy variable.

Bilateral exports of fruits in HS code category 08 that include fresh and processed fruits were used as the dependent variables in alternative specifications. The data set comprised of exports of 52 products from Afghanistan into 40 export destinations in 2008 and 2018. The total number of observations was 581. Export data were extracted from the United Nations Commodity Trade Statistics Database (UN Comtrade). The data on GDP were gathered from the World Bank. The data regarding the geographical distance between the capital cities of trading countries, common language, and common border were extracted from the Institute for Research on the International Economy (CEPII). The data on NTMs were extracted from the Trade Analysis and Information System (TRAINS) database of the United Nations Conference on Trade and Development (UNCTAD) where the NTMs are classified into 16 chapters. This classification comprises technical measures, such as Technical Barriers to Trade (TBT), Sanitary and Phyto-Sanitary (SPS) measures, and Pre-shipment Inspection (PSI) measures. The non-technical measures consisted of Quantity Control (QC), Price Control (PC), and Other (OTH) measures. Only import-related NTMs are considered in the estimation of the above model.

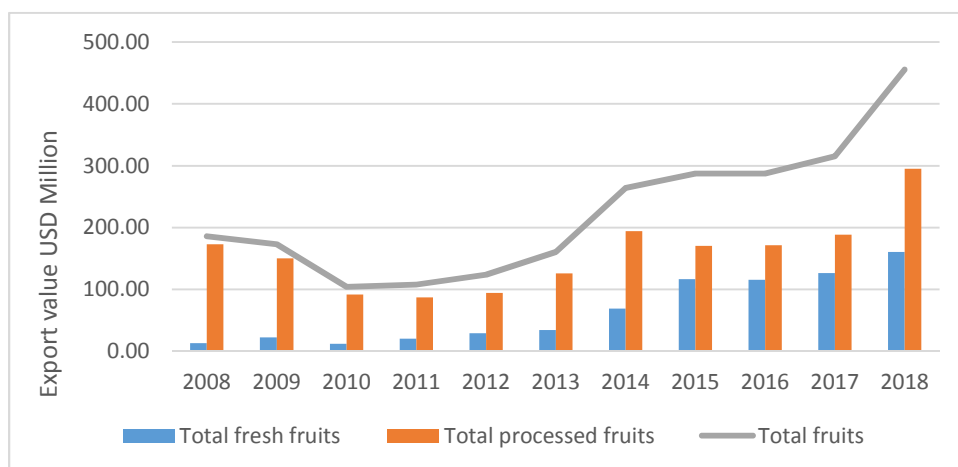


Figure 1: Value of Fruits Exports from Afghanistan during 2008-2018.

Above Figure depict that a rapid growth of the exports of fruits from Afghanistan can be observed after 2010. The values exports of processed fruits have consistently been higher than that of fresh fruits though fresh fruits exports have increased more than eightfold during 2008 – 2018.

An examination of NTMs shows an increase in the number of NTMs imposed by each export destination. The most commonly recorded NTMs against Afghan fruits are Technical Barriers to Trade (TBT) followed by the SPS measures. TBTs represent 37% and SPSs represent 22% of the total NTMs respectively in 2018. More NTMs have been imposed on processed fruits compared to those of fresh fruits. The descriptive statistics of the variables used in the gravity estimation presented in table 1.

Table 1: Descriptive Statistics of the Variables used in the Estimation

Variables	Units	Mean	Std. Error	Minimum	Maximum
Export value	USD Million	1.36	0.26	0	104.09
Exporter's GDP	USD Billion	66.02	0.32	54.71	71.27
Importer's GDP	USD Billion	20,767	1,734	7.38	194,688
Distance	KM	3,859	143.95	374.65	13,762
Common language	Dummy	0.05	0.01	0	1
Common border	Dummy	0.23	0.02	0	1
Member of SAARC	Dummy	0.24	0.02	0	1
Total NTMs	Number	331.3	39.13	0	5,001
TBT	Number	272.54	58.24	0	3,954
SPS	Number	158.02	28.42	0	1,466
PSI	Number	8.15	1.17	0	69
PC	Number	10.53	1.24	0	69
QC	Number	30.56	4.80	0	284
OTH	Number	3.16	0.72	0	57

Note: TBT- Technical Barriers to Trade, SPS- Sanitary and Phyto-Sanitary, PSI- Pre-Shipment Inspection, PC- Price Control, QC- Quantity Control and OTH- Other

Results and Discussion

Alternative estimation techniques namely Ordinary Least Square (OLS) regression, Poisson pseudo maximum likelihood (PPML) and Poisson model with Fixed effect (PFE) were employed to ascertain the effect of dependent variable on export value of fruits. The results of the estimation are presented in table 2. A log-log formulations have been used and zero export values were replaced with very small values.

Table 2: Results of the Gravity Model

Variables	Units	Log of total NTMs			NTMs as Dummy		
		OLS	PFE	PPML	OLS	PFE	PPML
Ln-Exporter GDP	US\$ Billion	0.72 (2.03)	0.72 (1.5)	0.33 (1.2)	1.2 (2.1)	1.24 (1.7)	0.53 (1.2)
Ln-Importer GDP	US\$ Billion	0.09 (0.05)	0.085 (0.06)	0.14*** (0.05)	0.115 (0.06)	0.115 (0.07)	0.177*** (0.04)
Ln-Distance	Km	-0.44*** (0.21)	-0.44 (0.33)	-0.66*** (0.19)	-0.34 (0.19)	-0.34 (0.24)	-0.52*** (0.22)
NTMs	Number/ dummy	0.28*** (0.09)	0.28** (0.13)	0.25*** (0.06)	0.63** (0.32)	0.64 (0.57)	0.76** (0.38)
Common Language	Dummy	0.29 (0.08)	0.29 (0.32)	0.083 (0.45)	0.3 (0.78)	0.31 (0.37)	0.22 (0.45)
Common Border	Dummy	0.007** (1.1)	0.007*** (0.36)	0.43 (0.47)	-0.13 (1.12)	-0.14 (0.42)	0.094 (0.53)
SAARC	Dummy	3.48*** (0.91)	3.49*** (0.61)	1.44*** (0.42)	3.83*** (0.98)	3.84*** (0.54)	1.77*** (0.45)

Note: Robust standard errors are in parentheses. *, ** and *** denote significance at 10%, 5% and 1% levels, respectively.

The results show that the GDP of the exporter has a positive and significant effect on bilateral export of fruit exports of Afghanistan. The coefficient of geographical distance was negative and statistically significant indicating that Afghanistan has been exporting more to neighboring countries. The coefficient of common border was positive and statistically significant. Since most of fresh fruits do not have a long shelf life, export to the neighbors can guarantee a safe reach to the partner county. The coefficient of SAARC is highly significant and positive. Common language do not have a significant effect on bilateral trade of fruits. The coefficients of NTMs (log and dummy) on fruits exports were positive, small and statistically significant in all models reported in Table 2 except for one. Similar results were obtained when sub-samples were estimated, i.e., the effects of NTMs on exports of fresh fruits, exports of processed fruits, exports of fruits in 2008, and exports of fruits in 2018 were also positive and small and in most cases statistically significant.

Conclusions

This study was conducted to determine the effect of NTMs on the export of fruits from Afghanistan during 2008-2018 using a gravity analysis. It was revealed that technical barriers to trade and sanitary and phyto-sanitary were the major NTMs faced by the exports of fruit products from Afghanistan. Processed fruits, which constitute a relatively higher portion in the Afghan fruit export basket, faced higher NTMs compared to fresh fruits. The results reveal a small, positive and statistically significant effect of NTMs on the exports of fruits from Afghanistan suggesting that Afghanistan was successful in penetrating to exports markets that are regulated through NTMs. Further studies that estimate different specifications of the gravity model to examine the effect of each NTMs component on export flows are suggested.

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