

## Evaluation of impact of non-tariff measures on tea exports from Sri Lanka by gravity model

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### 1. Introduction

Tea is one of the most widespread beverages of the world, traded worldwide for centuries. Sri Lanka is the largest value-added tea exporter and largest orthodox tea producer and exporter. Turkey, Russia, Iraq, Iran, and China were the major destinations of Sri Lankan tea in 2020 (Export Development board). International trade have been exposed to diversified range of policy measures. Among those, there are policy measures which aim to ensure production quality standards and consumer safety, and they are referred to as non-tariff measures (NTMs). According to the United Nations Conference on Trade and Development (UNCTAD, 2015), any trade policy instrument used to regulate international trade other than ordinary tariffs is defined as NTMs. Generally, NTMs are raising the export cost of suppliers, especially in developing countries such as Sri Lanka. Nevertheless, the highest number of NTMs are imposed by developed countries. Under the General Agreement on Tariffs and Trade (GATT), tariff barriers were reduced through multilateral negotiations and therefore, countries use more NTMs (Melo & Nicita, 2018). Analysis of the effect of NTMs for several export commodities have been done in the literature. Thus, the study focuses on determining the impact of NTMs on the tea exports from Sri Lanka. Since tea is one of the major agricultural export commodities in Sri Lanka, it is very important to study about the effect of NTMs to tea exports.

### 2. Materials and Methods

The methodology of the study focused on determine whether there is an impact from NTMs to tea exports from Sri Lanka. The most famous model used in the literature to analyze the effect of NTMs is the gravity model. Recognition of the gravity model to measure trade restrictions by NTMs has improved over the last decade (Xiong & Beghin, 2011). The empirical gravity model used in the study is given below.

$$\ln X_{kijt} = \beta_0 + \beta_1 \ln GDP_{it} + \beta_2 \ln GDP_{jt} + \beta_3 \ln DIS_{ij} + \beta_4 \ln POP_{it} + \beta_5 \ln POP_{jt} + \beta_6 SAARC_{ijt} + \beta_7 DNTMk_{ijt} + \varepsilon_{kijt}$$

Where,  $X_{kijt}$  is the export value of tea to the  $i^{\text{th}}$  importing country from Sri Lanka at time  $t$ ,  $GDP_{it}$  is the gross domestic product of  $i^{\text{th}}$  importing country at time  $t$ ,  $GDP_{jt}$  is the gross domestic product of Sri Lanka at time  $t$ ,  $DIS_{ij}$  is the distance between the capital of the  $i^{\text{th}}$  importing country and capital of Sri Lanka,  $POP_{jt}$  is the population of Sri Lanka at time  $t$ ,  $POP_{it}$  is the population of  $i^{\text{th}}$  importing country at time  $t$ ,  $SAARC_{ijt}$  is the dummy for membership of SAARC,  $DNTMk_{ijt}$  is the dummy for the total NTMs country  $i$  has imposed on the exported product  $k$  from Sri Lanka and  $\varepsilon_{kijt}$  is the error. Dummy variables are equal to one when the tested variable is present in the particular country and zero otherwise.

Hypothesis tested in the study were,

H0- There is no any significant impact from non-tariff measures on export value of tea

H1- There is a significant impact from non-tariff measures on export value of tea

The data set included data from 2007 to 2017 on yearly basis, from top 15 tea import countries from Sri Lanka regarding Tea, black; (fermented) and partly fermented tea, in immediate

packing of a content exceeding 3kg in the harmonized system (HS) 6-digit level. Tea export data were obtained by United Nations Commodity Trade Statistics Database (COMTRADE). GDP and population data were extracted from World Bank database. Bilateral distance between capital cities of Sri Lanka and the importing countries were taken from the Institute for Research on the International Economy (CEPII). The data on NTMs were obtained by Trade Analysis Information System (TRAINS) of the UNCTAD and WTO integrated database provided by World Integrated Trade Solutions (WITS).

Ordinary Least Squares (OLS) and Poisson Pseudo Maximum Likelihood (PPML) techniques were used to estimate the gravity model. PPML can counter the heteroscedasticity in the log linear form of gravity variables due to the existence of many zero values (Sandaruwan et al., 2020).

### 3. Results and Discussion

Results obtained from the estimation of gravity model are shown in the following table (Table 01).

**Table 01. Results of the gravity model estimations**

Variables	Unit	OLS	PPML
Ln_Exporter GDP	US \$ billion	0.648 (0.93)	-0.054 (0.28)
Ln_Importer GDP	US \$ billion	0.055** (0.14)	-0.066 (0.07)
Ln_Distance	Km	-5.041*** (0.33)	-1.580 (0.26)
Ln_Exporter population	Number	-0.178 (1.25)	3.160 (0.35)
Ln_Importer population	Number	0.343 (0.15)	0.215** (0.08)
Dummy SAARC country	Dummy	0.748 (0.53)	-1.283 (0.277)
Dummy NTM	Dummy	-0.733** (0.53)	-0.018** (0.46)

Robust standard errors are in parentheses.

\*, \*\* and \*\*\* asterisks denote significance at 10%, 5% and 1% levels respectively

Source: Prepared by the authors based on the regression estimates

Overall model is significant with a high F statistic which means coefficients are jointly zero at the 0.05 confidence level. Both GDPs influences exports positively. Nevertheless only importing country's GDP is statistically significant. According to the parameter estimates, when distance increases, exports decreases. The population of the export country was not significant while that of the import country was significant. Parameter estimation for dummy variable for total NTMs was negative and statistically significant. Compared to no NTMs, when there are NTMs imposed, tea exports decreases.

### 4. Conclusions

The study focused on providing some empirical evidences on the effect of NTMs on Sri Lankan tea exports. According to the literature, because of the decreasing of tariffs and increasing of NTMs, importers used to set more NTMs for import products, especially from developing

countries. In the recent past, there were some sanitary issues raised with exported tea bulks from Sri Lanka and such problems should be avoided by adapting sanitary and phytosanitary requirements. The production cost of tea may be increased by fulfilling these requirements. Nevertheless the relevant institutes of Sri Lanka such as, tea board, Export Development Board and Tea Research Institute should support the producers and exporters to adopt the changing NTM requirements in importing countries with additional subsidies. One of the issues faced during the study was the unavailability of NTM data for some countries in UNCTAD database. This will be discounted by a country level literature surveys in further researches.

## 5. References

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