Do Non-Tariff Measures Matter? Assessing the Impact of Technical Measures to Trade on the Exports of Pakistan

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Introduction

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- ▶ NTMs tend to increase the costs of trading across countries.
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  - ▶ NTMs can be **trade-enhancing** if exporters are able to increase consumer awareness and benefit from a reduction in competition from non-compliant firms.
- ▶ In this chapter, we will determine the role of SPS and TBT measures on the exports of Pakistan.

Export Composition of Pakistan

- Similar to several developing countries, Pakistan's exports are concentrated in a few products that do not represent a significant proportion of world trade.
  - Textile products: More than 70 percent of Pakistan's exports but only 4 percent of overall global trade.
  - Vegetable products (primarily rice): 6 percent of Pakistan's exports but only 3 percent of global trade
  - Leather products: 6 percent of Pakistan's exports but only 0.6 percent of global trade.
- Composition of Pakistan's exports is likely to vary significantly from the composition of global imports into the trading partner.
- This gap in relative trade importance is used to introduce a novel concept, which I label as the 'exporter-importer bias'

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- ▶ Indication of the importance in trade composition of a particular product for the exporting country relative to that for the importing country.
- ▶ If EI $= 1$, the product has an equal contribution to the total exports of the exporting partner as it has to the total imports of the importing partner
- ▶ If EI > 1, the product has a greater contribution to the total exports of the exporting country than it has to the total imports of the importing country.
- ▶ If EI < 1, the product has a smaller contribution to the total exports of the exporting country than it has to the total imports of the importing country.

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- ▶ If $EI < 1$, the product has a smaller contribution to the total exports of the exporting country than it has to the total imports of the importing country.
- ▶ Once interacted with a NTM, higher the exporter-importer bias, more important is the measure to the exporter than it is to the importer.

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- ▶ In other words, when the bias is large, exporters will prefer to achieve economies of scale through export specialization. They are less likely to be burdened by the stringency of the regulations.
    - ▶ Greater the bias, lower the importance of the product to the consumers in the importing market relative to the importance to the producers in the exporting country.
    - ▶ Lower the bias, exporters can benefit from stringent measures that reduces competition.

Introduction: Hypothesis

- ▶ I test the hypothesis whether NTMs become less restrictive when the exporter-importer bias is larger.

- ▶ Higher the market share of the product (in the export bundle) exported to a trading partner, greater the incentive of the exporters to comply with the measures as exporting country specializes in the product.

- ▶ However, as the importance of the product increases for the importers, they are likely to be more predisposed towards imposing stringent measures.

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- ▶ Higher E-I bias (more important for the exporters), more export specialization.

- ▶ Lower E-I bias (more important for the importers), greater stringency in regulations.

Introduction: Empirical Strategy

▶ I determine the impact of the SPS and TBT measures on exports of Pakistan as the exporter-importer bias varies.

▶ I consider the frequency index (proportion of products) and the coverage ratio (proportion of imports) reporting SPS and TBT measures. These are interacted with the E-I bias.

▶ Some importing countries may impose measures that are more intensive than other countries.

    ▶ I define markets to be either 'well-regulated' or 'less-regulated' based on the level of intensity of measures imposed on each product imported relative to the global average.

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- ▶ Some importing countries may impose measures that are more intensive than other countries.
    - ▶ I define markets to be either 'well-regulated' or 'less-regulated' based on the level of intensity of measures imposed on each product imported relative to the global average.
    - ▶ Exporters are more likely to face NTMs in well-regulated markets than in less-regulated markets.
    - ▶ Less regulated markets may allow greater leverage to exporters.

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  - ▶ Exporters facing SPS measures are more likely to benefit from export specialization.
- ▶ TBTs are trade-enhancing regardless of the exporter-importer bias.
- ▶ When considering the level of regulation of markets, TBT measures have the following impact:

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- ▶ SPS measures become less trade-restrictive when the exporter-importer bias is high.
  - ▶ Exporters facing SPS measures are more likely to benefit from export specialization.
- ▶ TBTs are trade-enhancing regardless of the exporter-importer bias.
- ▶ When considering the level of regulation of markets, TBT measures have the following impact:
  - ▶ TBTs are trade-enhancing within less-regulated markets.
  - ▶ However, higher stringency of TBTs may increase exports within well-regulated markets.

Literature Review

- The literature generally agrees that NTMs affect trade and that they have an adverse impact on the exports of low income countries.

- Otsuki et al. (2001), Maskus et al. (2005), and Chen et al. (2006) estimate the impact of NTMs on exports and find that there is a negative impact of NTMs.

- Murina and Nicita (2017) report higher burden on exporters from SPS measures, while Andriamananjara et al. (2004) report significant gains from unilateral liberalization of NTMs to EU and Japan.

- Moenius (2004) and Moenius (2006) point out the benefits of NTMs from product adaptation as standardization can lead to an increase in trade.
    - They focus on TBTs. As SPS measures are on homogeneous agricultural products, they may not provide opportunities of product adaptation.

Literature Review

- Differences in how measures are applied. Gourdon and Nicita (2017) report that SPS measures are often accompanied by TBTs, while TBTs tend to be applied by themselves in several cases.

- Differing impacts. Fontagnè and Orefice (2016) find a positive impact of TBTs on the exports of French firms. Stringent TBTs may lower competition and increase exports.

- On the other hand, Fontagnè et al. (2015) find a negative impact of SPS measures on French exporters, suggesting limited benefits of a reduction in competition.

- I find that SPS measures tend to be less trade restricting as the exporter-importer bias increases, while TBT measures are unlikely to be impacted by the exporter-importer bias.

The Difference between the Two Measures

- ▶ Ahn(2001) compares the differences between SPS and TBT measures.
  - ▶ SPS measures are often scientifically justified and are less likely to be discriminatory on trading partners with similar characteristics.
  - ▶ TBT measures tend to be complex due to a large array of rules and regulations for the exporters.
  - ▶ However, TBTs benefit exporters as product adaptation may increase consumer awareness (through certifications, markings and labeling).
- ▶ TBT measures may benefit exporters if the reduction in information costs outweigh the gain in product adaptation costs.

The Difference between the Two Measures

- ▶ SPS measures are likely to be imposed on agricultural goods to limit imports from risk-prone areas. SPS measures are typically associated with human or plant safety.
- ▶ Compliance with SPS measures may not reduce information costs as ability to pass information to consumers may be low.
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- ▶ Stringency in SPS measures may increase product adaptation costs without reducing information costs.
- ▶ TBT measures require strict conformity to predisposed production guidelines, during the manufacturing stage, that may increase consumer awareness and reduce information costs.
- ▶ Stringent TBT measures may increase product adaptation costs but at the same reduce the costs to gather information on consumer preferences and other legitimate objectives in export market.

Data

- ▶ Data on SPS and TBT is extracted from UNCTAD TRAINS database. It is reported at six digit HS code from 2012 to 2015 for each trading partner.
- ▶ The data on trade flows are retrieved from the UN Comtrade database.
- ▶ Although data is retrieved at six-digit HS code, the indices are constructed at 22 HS sections across 71 countries.
- ▶ Although NTM data is reported only once for each trading partner, the indices are constructed for each year.
- ▶ The indices are calculated in the form of frequency index, the coverage ratio and the exporter-importer bias. These variables will be used as inputs to determine the impact of NTMs on exports of Pakistan.

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- Both measures are bounded between 0 and 1. FI and CR may differ if a country imposes NTMs on products that are in greater demand but leaves those less frequently traded to be unregulated.

Exporter-Importer Bias

- Exporter-importer bias is calculated as the share of the product in the export bundle of the exporting country to the share of the product in the import bundle of the importing country.

- $$E_{ijst} = \frac{\frac{x_{jst}}{\sum_{s=1}^{22} x_{jst}}}{\frac{M_{ist}}{\sum_{s=1}^{22} M_{ist}}}$$

- Positively associated with an increase in the share of a product in the export bundle of the exporting country.
  - This indicates the level of export specialization in a particular product.
- Negatively associated with an increase in the share of a product in the import bundle of the importing country.
  - This indicates stringency in regulations on a particular product by the importing country.

Summary Statistics

	Mean	Median	Std. Dev.	Min	Max
E-I bias	1.81	0.05	5.71	0	146.67
Frequency index (SPS)	0.26	0.04	0.37	0	1.00
Coverage ratio (SPS)	0.26	0.02	0.38	0	1.00
Frequency index (TBT)	0.57	0.79	0.40	0	1.00
Coverage ratio (TBT)	0.62	0.86	0.41	0	1.00
E-I bias * FI (SPS)	0.41	0.00	1.78	0	26.74
E-I bias * CR (SPS)	0.37	0.00	1.74	0	27.61
E-I bias * FI (TBT)	1.22	0.01	4.43	0	65.19
E-I bias * CR (TBT)	1.27	0.01	4.43	0	53.71

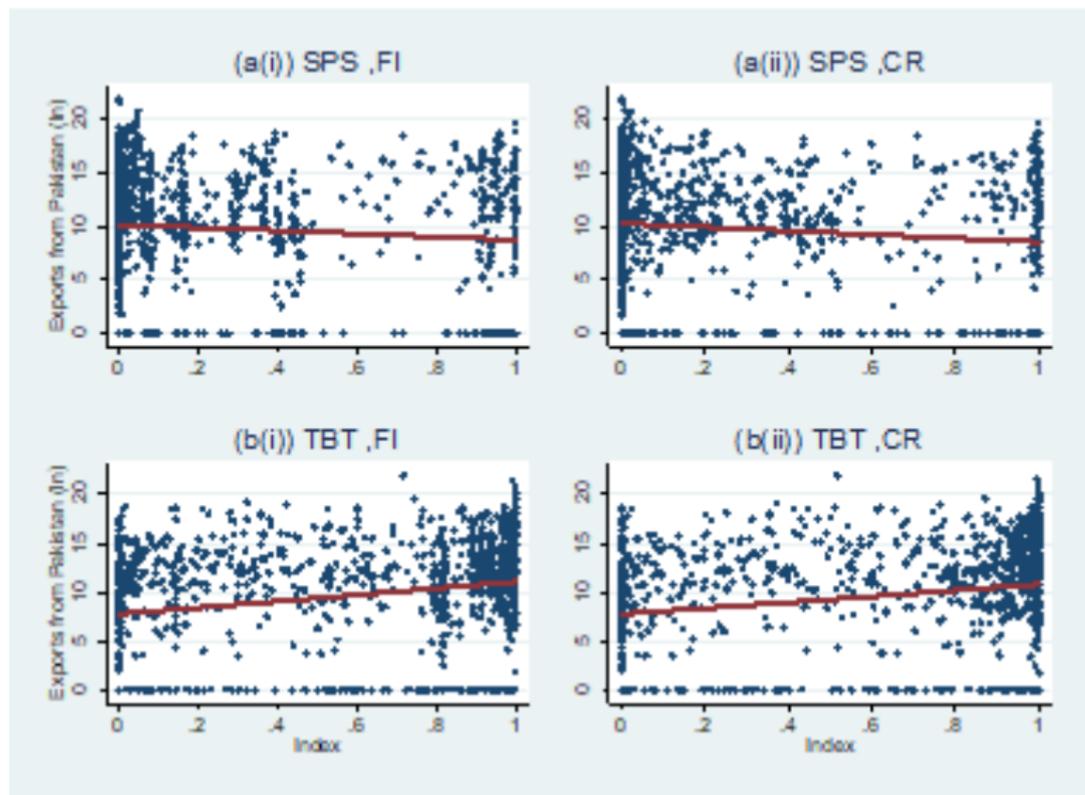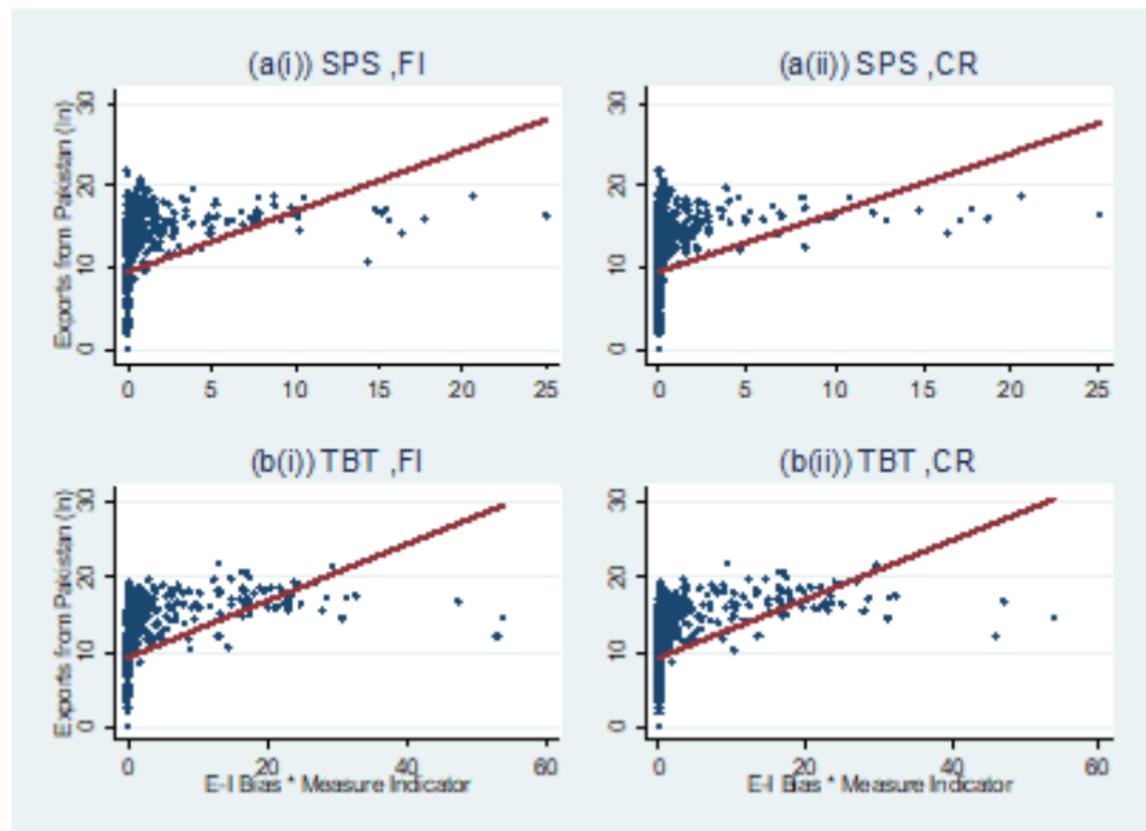# Fig 1: Correlation between Exports from Pakistan and Measure Indicators of SPS and TBTs

Fig 2: Correlation between Exports from Pakistan and Interaction of E-I Bias with Indicators of SPS and TBTs

Findings of Table 1, Figures 1 and 2

- ► TBTs are more commonly applied than SPS measures. Both the frequency index and the coverage ratio for TBTs are higher than for SPS measures.

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- ▶ In Figure 1, higher the intensity of SPS measures, lower the exports. Higher the intensity of TBTs, higher the exports.
- ▶ In Figure 2, there is a positive relationship across all graphs. If compliance with SPS measures can increase exports to multiple markets, the trade-restricting nature of SPS can be lessened.

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- ▶ As expected, the exporter-importer bias increases the intensity of NTMs of those products commonly exported by Pakistan.

- ▶ The econometric analysis which uses various control variables will determine the impact, ceteris paribus, of the interaction of exporter-importer bias and incidence of NTMs on exports of Pakistan.

Econometric Analysis

▶ To test the hypothesis that SPS and TBT measures affect the exports of Pakistan based on the level of exporter-importer bias, we consider the following regression:

$$lnX_{ist} = \beta_1(EI_{ist} * NTM_{ist}) + \beta_2 NTM_{ist} + \beta_3 EI_{ist} + \beta_4 W_{ist} + \alpha_i + \mu_s + \gamma_t + \epsilon_{ist}$$

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▶ For robustness, the sample is split according to the level of regulation of the markets.

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▶ As predominant product specifications are likely to accompany TBT measures, stringent TBTs can be trade-enhancing if they are able to reduce information costs and benefit exporters.

   ▶ We expect a **negative** relationship for TBTs.

Table 2: Pooled OLS regressions on exports of Pakistan by measure indicator

	(1)	(2)	(3)	(4)
Measure Indicator	FI	CR	FI	CR
Measure	SPS	SPS	TBT	TBT
E-I Bias * Measure Indicator	0.21***	0.24***	-0.04	-0.02
	(0.04)	(0.03)	(0.03)	(0.03)
Measure Indicator	-0.46	-0.66***	0.52**	0.60***
	(0.29)	(0.25)	(0.23)	(0.2)
E-I Bias	0.13***	0.13***	0.18***	0.17***
	(0.02)	(0.02)	(0.04)	(0.04)
Weighted Average Tariff (ln)	0.79***	0.79***	0.80***	0.80***
	(0.05)	(0.05)	(0.05)	(0.05)
Constant	4.76***	4.97***	4.06***	3.96***
	(0.61)	(0.56)	(0.51)	(0.5)
Observations	5'450	5'450	5'450	5'450
R-squared	0.74	0.74	0.74	0.74

Note: Robust standard errors in parentheses *** $p<0.01$, ** $p<0.05$, * $p<0.1$ Includes importer, product and year fixed effects Dep. Var: Exports of Pakistan (ln)

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- ▶ TBTs are trade-enhancing regardless of the exporter-importer bias.
- ▶ The main effect of exporter-importer bias is positive. The weighted average tariff is also positive, suggesting the importance of tariff policy.

Table 3: OLS regressions on the exports of Pakistan by measure indicator within well-regulated and less-regulated markets

	(1)	(2)	(3)	(4)
Measure Indicator	FI	CR	FI	CR
Measure	SPS	SPS	TBT	TBT
Well-Regulated Markets				
E-I Bias * Measure Indicator	0.17***	0.22***	-0.91***	-1.01***
	(0.06)	(0.06)	(0.14)	(0.15)
Measure Indicator	0.29	-0.39	-1.65*	-0.24
	(0.64)	(0.55)	(0.95)	(0.72)
E-I Bias	0.15***	0.16***	1.04***	1.16***
	(0.04)	(0.04)	(0.13)	(0.14)
Less-Regulated Markets				
E-I Bias * Measure Indicator	0.27***	0.40***	-0.15	-0.07
	(0.06)	(0.13)	(0.1)	(0.08)
Measure Indicator	-1.73**	-4.77***	2.35***	1.18**
	(0.84)	(0.77)	(0.51)	(0.52)
E-I Bias	0.11***	0.11***	0.19***	0.15***
	(0.02)	(0.01)	(0.05)	(0.03)

Note: Robust standard errors in parentheses *** $p<0.01$, ** $p<0.05$, * $p<0.1$ Includes importer, product and year fixed effects Dep. Var: Exports of Pakistan (ln)

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▶ The exporters to less-regulated markets can leverage the benefits from the differences in the incidence of SPS and TBT measures.

Conclusion

- ▶ SPS and TBT measures matter for the exports of Pakistan. However, E-I bias plays an important role.

- ▶ SPS measures have a negative impact on the exports of Pakistan. However, as E-I bias increases, trade restrictiveness of SPS measures decline.

- ▶ Although, TBT measures are likely to have a positive impact on exports, E-I bias does not influence exports except for within well-regulated markets.

- ▶ Exporters are likely to comply with SPS measures when they cannot only specialize in exports but also export to markets with lower levels of stringency. We do not see the same for TBTs.

- ▶ Incentive schemes for exporters must be designed to take into account the role of E-I bias on exports.

Work in Progress

- Firm-level study that determines the impact of the importance of NTMs on the exports of Pakistan across agricultural and non-agricultural goods.

- The importance of a trading partner imposing the measure is gauged by the relative size of total import demand accessible to a firm.

- TBT measures imposed by more important trading partners tend to increase exports of non-agricultural producers.

- SPS measures imposed by more important trading partners tend to inhibit exports of non-agricultural producers.

- We consider the impact across well-regulated and less-regulated products. We find the impact stronger for the latter set of products.

- We do not find a significant relationship for agricultural products.

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- Across countries with different patterns of trade in order to test the robustness of the exporter-importer bias.

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- Across countries with different patterns of trade in order to test the robustness of the exporter-importer bias.
- Whether products that involve SDGs have a greater bias? Whether such a bias can help the exporting countries? Whether SDGs are likely to be an exporter-side or an importer-side initiative?
- Is the exporter-importer bias strong enough to alleviate concerns regarding the development of a country? Consider various product/industry-level measures.