Non-tariff measures and time and costs at border crossing points of perishable goods:

Impact on CAREC intra-regional trade

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Trade Facilitation in CAREC: A 10-year CPMM Perspective

ADB

Trade Facilitation

- encompasses the overall environment for international transactions, such as the simplification, modernization and harmonization of export and import processes (WTO)
- comprises all factors that streamline and simplify the technical and legal procedures for products entering or leaving a country to be traded internationally (OECD)
- these factors are split into two broad measures and activities: (1) **"at the border"** and (2) **"behind the border"**

"At the border"

- logistics and freight
- customs administration
- border controls

"Behind the border"

- infrastructure
- regulatory environment
- trade policies (e.g., non-tariff measures)

CPMM

- TFI1   Time taken to clear a border crossing point (hour)
- TFI2   Cost incurred at border crossing clearance (US$)
- TFI3   Cost incurred to travel a corridor section (per 500km, per 20-ton cargo)
- TFI4   Speed to travel on CAREC Corridors (kph)
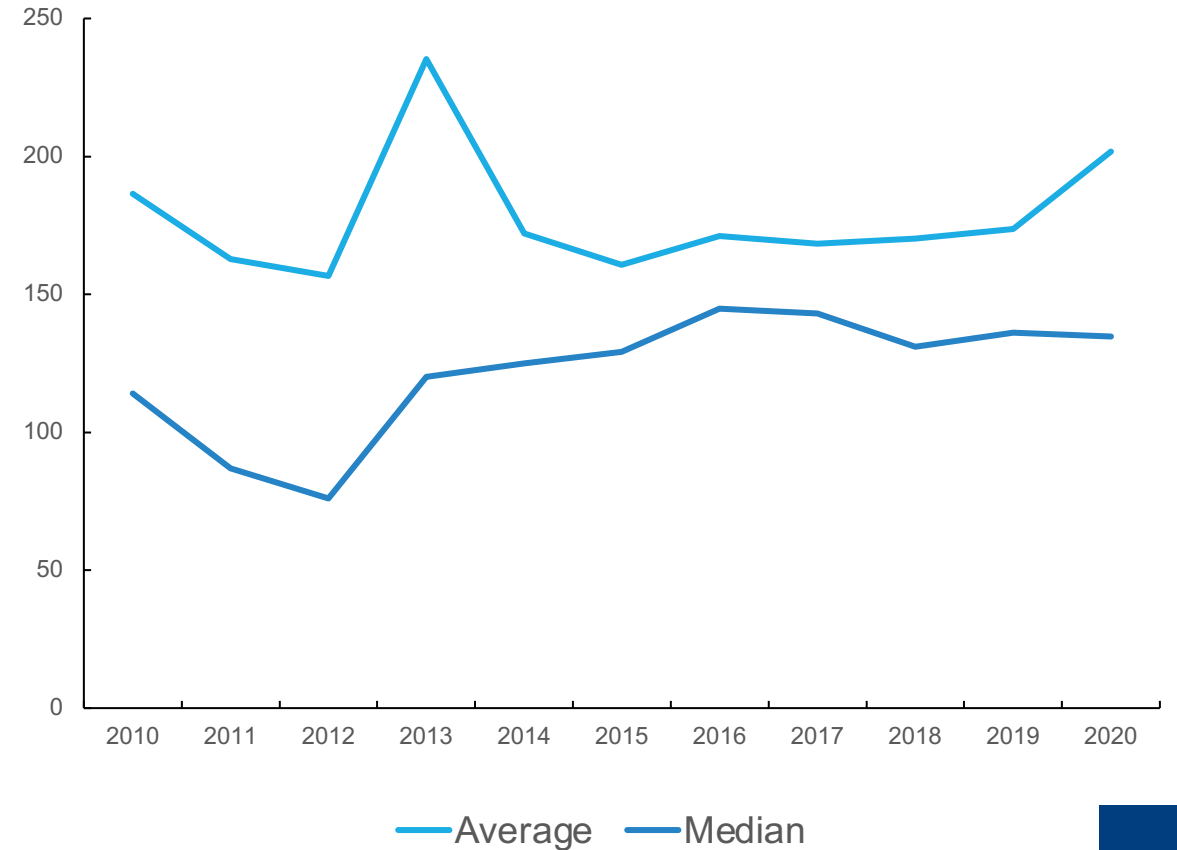
Non-Tariff Measures (NTM)

- Sanitary and Phyto-sanitary (SPS) measures
- Technical Barriers to Trade (TBT)
- Quantitative restrictions
- Safeguards, etc.

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Overall Trend: CPMM Data, 2010-2020

TF1: Time taken to clear a border crossing point (hour)

TF2: Cost incurred at border crossing clearance (US$)

Average   Median

Average   Median

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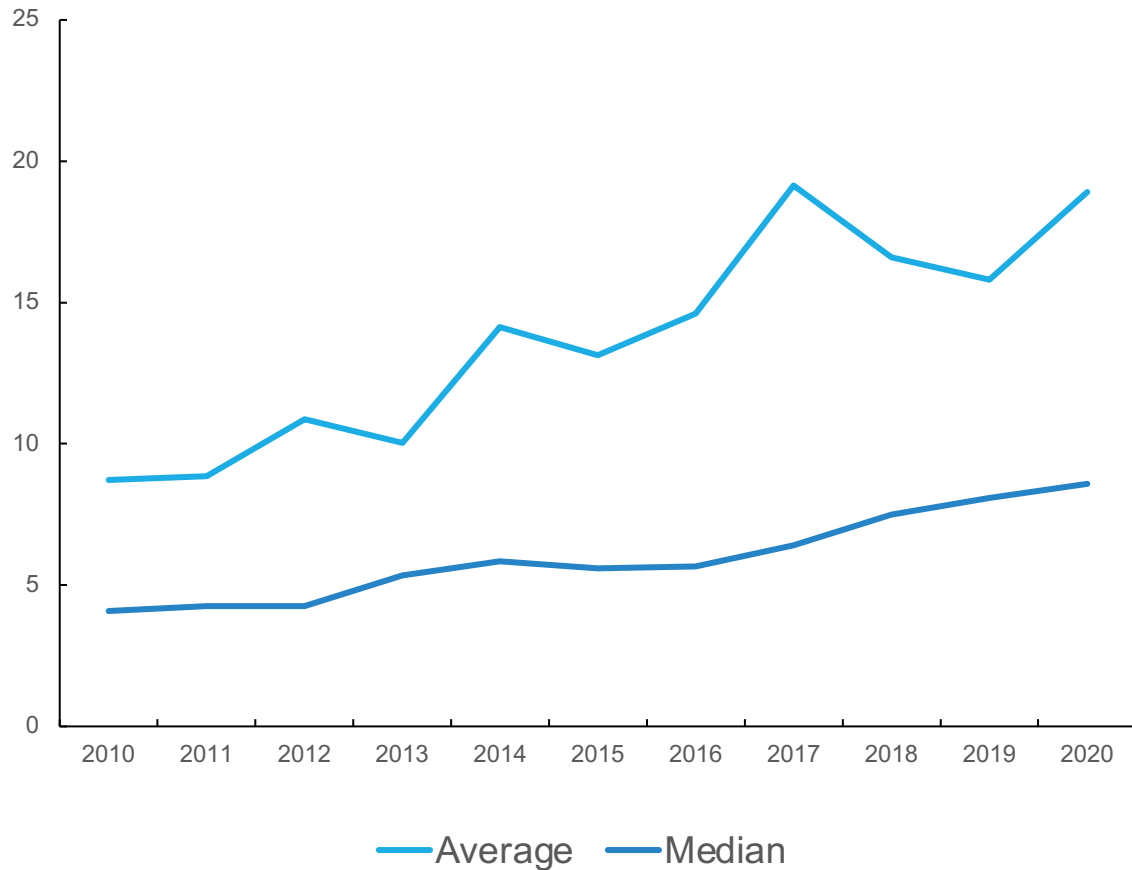
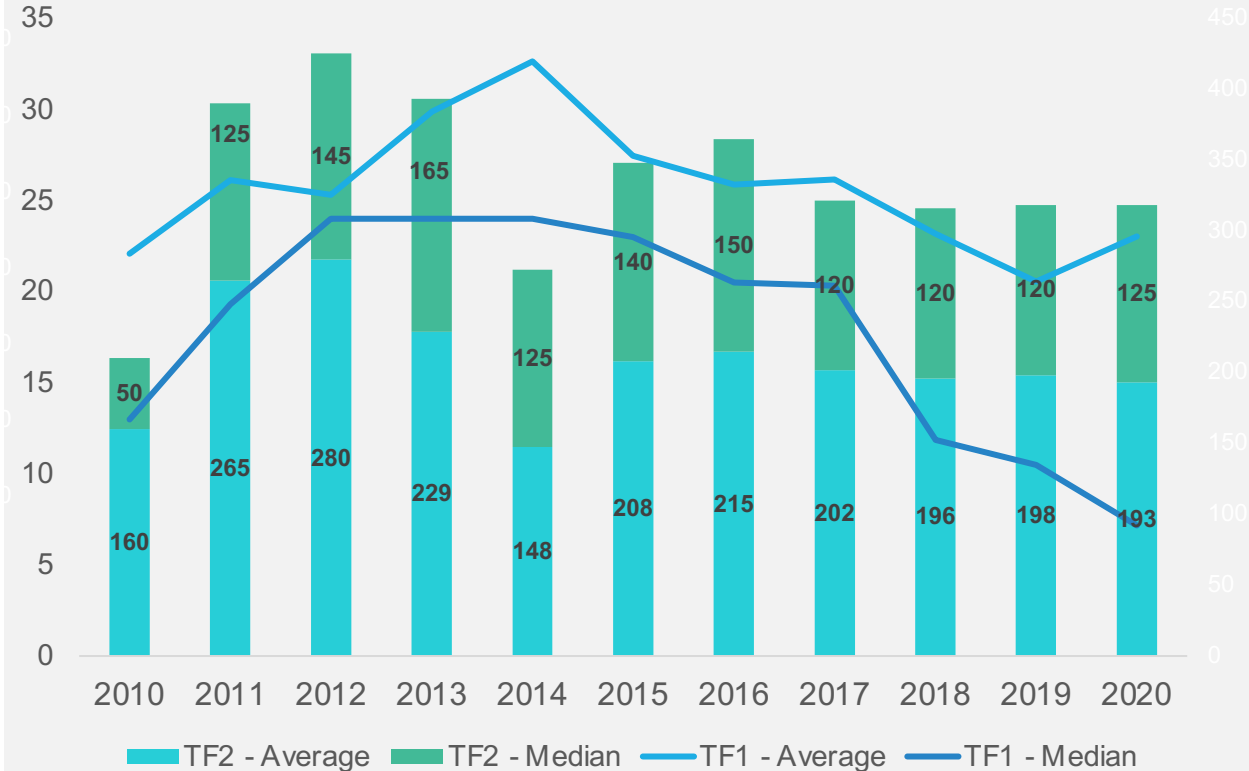# Rail and Road CPMM Data, 2010-2020
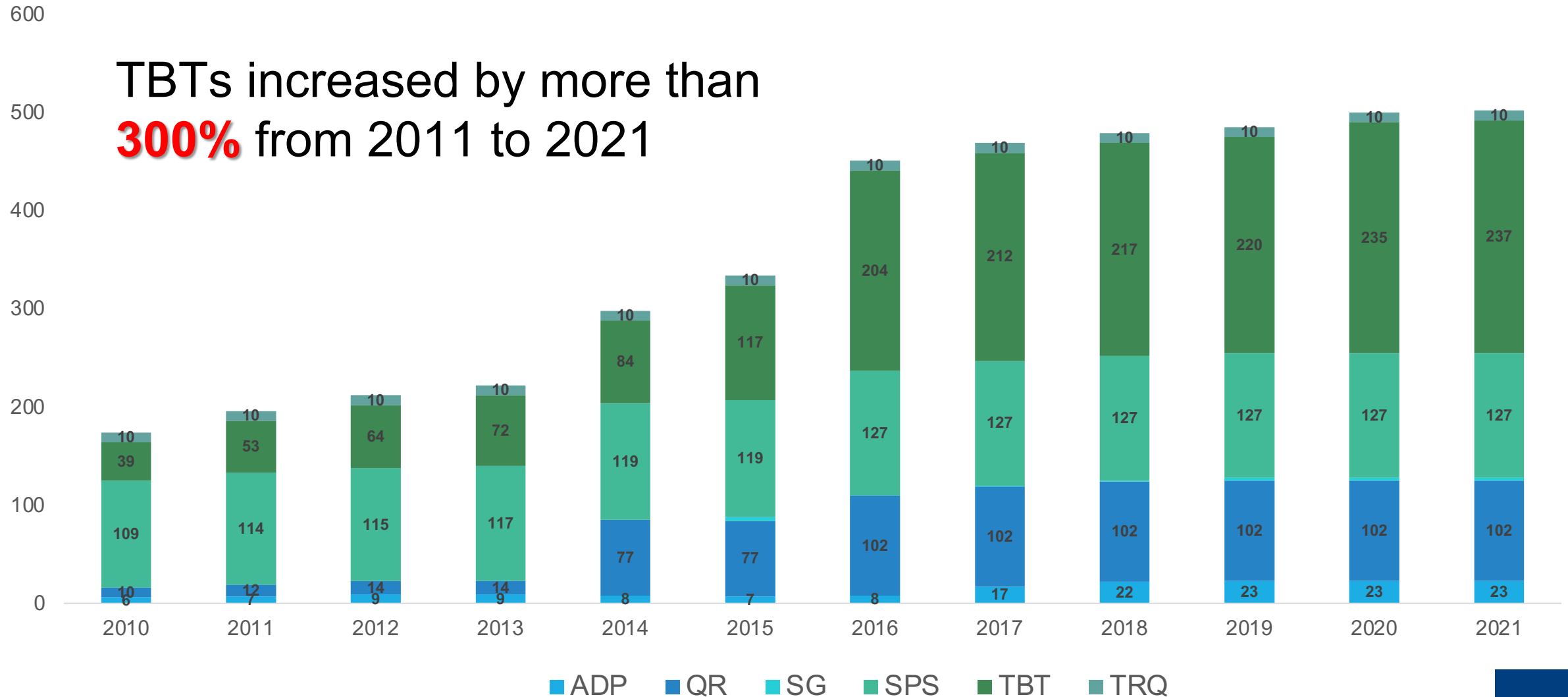

Road: Time (hours) and Cost (US$), 2010-2020
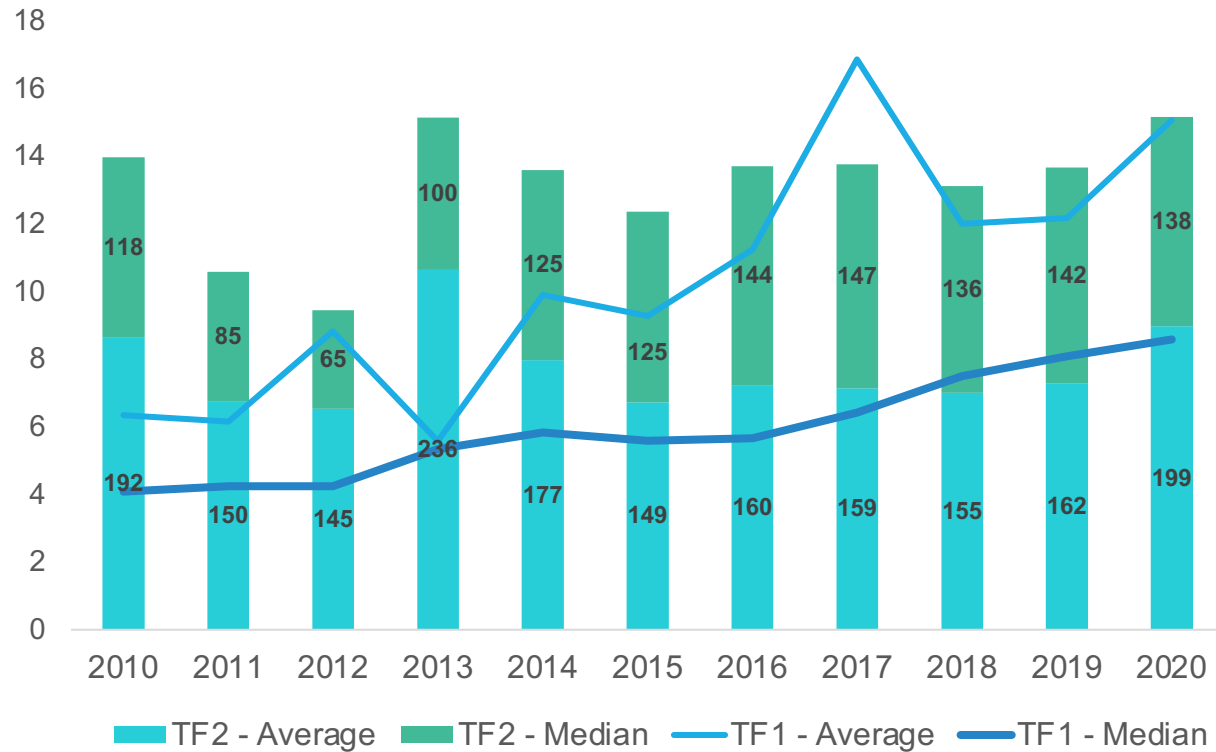
Rail: Time (hours) and Cost (US$), 2010-2020

Number of NTMs Affecting Intraregional CAREC Trade

TBTs increased by more than **300%** from 2011 to 2021

ADP=Anti-dumping; QR = quantitative restrictions; SG = safeguards; SPS = sanitary and phytosanitary measures; TBT = technical barriers to trade; TRQ = tariff rate quota

SPS and TBT measures are heavily imposed on CAREC intra-regional trade

Sanitary and Phytosanitary (SPS)

Measures that are applied:

- to protect human or animal life from risks arising from additives, contaminants, toxins or disease-causing organisms in their food;
- to protect human life from plantor animal-borne diseases;
- to protect animal or plant life from pests, diseases, or disease-causing organisms;
- to prevent or limit other damage to a country from the entry, establishment or spread of pests; and to protect biodiversity
- these include measures taken to protect the health of fish, wild fauna, forests and wild flora

Technical Regulations: Examples

Prohibitions: Imports of poultry from areas affected by avian influenza or of cattle from foot-and-mouth disease-affected countries are prohibited.

Tolerance limits for residues and restricted use of substances: A maximum residue limit is established for insecticides, pesticides, heavy metals and veterinary drug residues; persistent organic pollutants and other chemicals generated during processing; and residues of dithianon in apples and hop.

Conformity Assessment: Examples

Product registration and approval requirement: Food additives shall be approved by the relevant government agency.

Technical Barriers to Trade (TBT)

Measures referring to: (1) technical regulations and (2) procedures of assessment of conformity with technical regulations:

- **Technical regulations:** include terminology, symbols, packaging, marking or labelling requirements as they apply to a product, process or production method
- **Example: Tolerance limits for residues of or contamination by certain substances**
  - The salt level in cement or sulphur level in gasoline must be below the specified amount.
- **Conformity assessment:** include procedures for sampling, testing and inspection; evaluation, verification and assurance of conformity; registration, accreditation and approval
- **Example: Product registration/approval requirements**
  - Drugs and medicines must be registered before they can be imported.
  - They should prove to be safe and effective for their intended purpose in order to be registered.

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Share of Perishable Goods Imposed with SPS or TBT
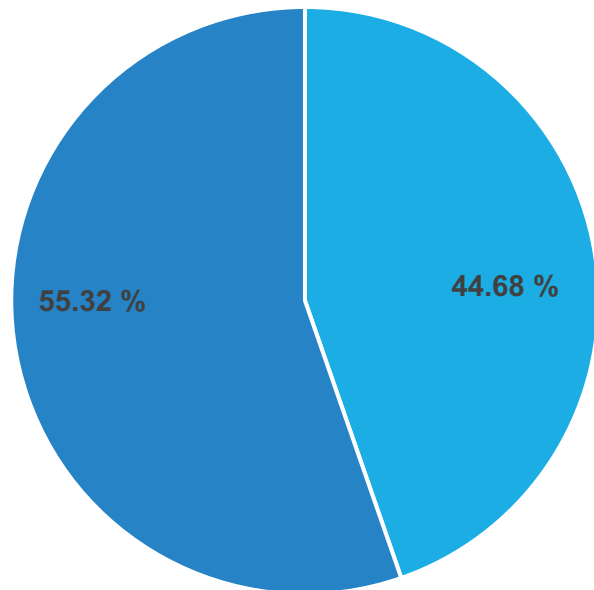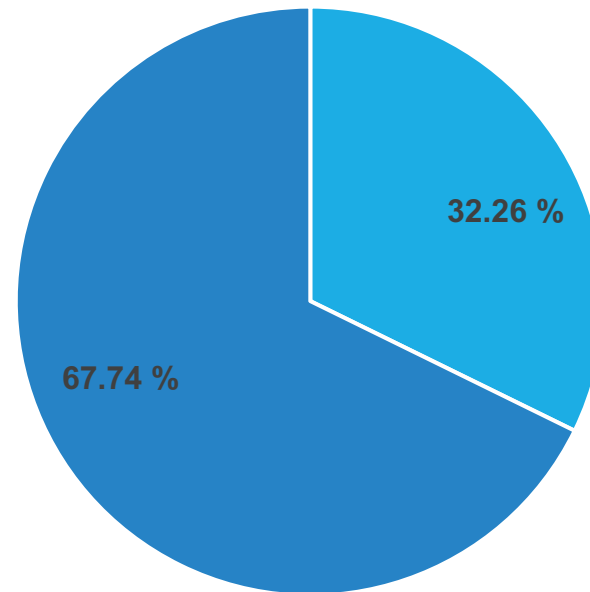
Share of Perishable Goods in CAREC Intraregional Trade

SPS

TBT

55.32 %

44.68 %

67.74 %

32.26 %

■ Perishable ■ Non-perishable

■ Perishable ■ Non-perishable

USD ($) Billions

86.9 %

85.9%

87.5%

13.1 %

14.1 %

12.5%

2018   2019   2020
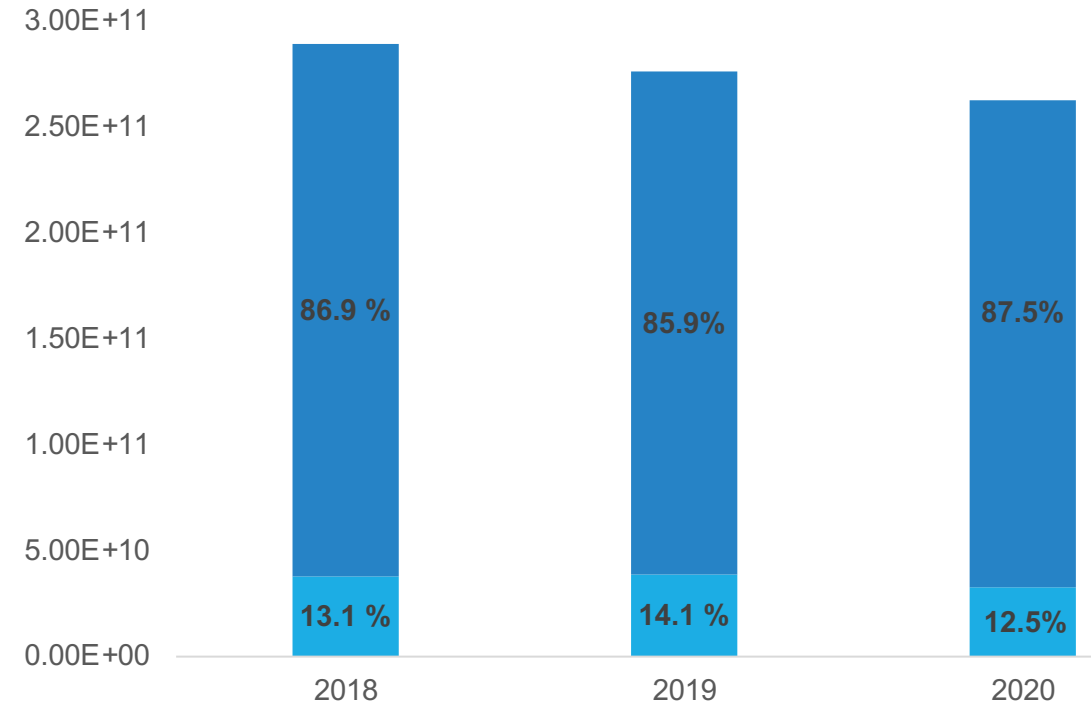
■ Perishable goods ■ Non-perishable goods

Examples of perishable goods: (1) Meat and edible meat offal; (2) Fish and crustaceans, mollusks and other aquatic invertebrates; (3) Fish and crustaceans, mollusks and other aquatic invertebrates; (4) dairy produce; (5) edible vegetables and certain roots and tubers; (6) edible fruits and nuts; (7) cereals; (8) pharmaceutical products, etc. → BASIC NECESSITIES

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Gap in literature

- Existing literature fails to adequately examine and provide policy recommendations on sector-specific trade costs that perishable goods such as agro-food goods and pharmaceutical products encounter both at-the-border and behind-the-border.

Research Objective

- Empirically investigate the separate and distinct impacts of at-the-border costs of (e.g., time and cost at border crossing points measured by CPMM TFIs) and behind-the-border costs (e.g., SPS and TBT) imposed on perishable goods on intraregional trade in landlocked economies

Why perishable goods?

- have higher costs of transportation due to the need for special handling such as cold chain
- most sensitive to travel duration as its quality, and therefore value, significantly deteriorates over time
- because consumption of perishable goods such as agricultural products and pharmaceuticals have direct implications on public health and safety, they are also heavily regulated through SPS and TBT measures

Hence, it is important to understand how perishable goods trade affect intraregional trade in landlocked economies such as the CAREC region.

Estimation Specification of the Gravity Model using PPML:

$$Y_{rpt}^{hs2} = \beta_0 + \beta_1 X_{rp} + \beta_2 Z_{bcp_{rpt}}^{hs2} + \beta_3 TP_{rpt}^{hs2} + \beta_4 ProdType^{hs2} + \delta_r F_r^{hs} + \delta_p F_p^{hs} + \delta_r F_r^{hs} + \delta_{rt} F_{rt} + \delta_{pt} F_{pt} + \delta_{rp} F_{rp}^{hs} + \delta_{rp} F_{BCP_{rp}} + \varepsilon_{rpt}^{hs2}$$

Y_{rpt}^{hs2} = value of country $r's$ HS2 level imports to country $p's$ at time t, expressed in levels

X_{rp} = vector of time-invariant exogenous trade cost variables

$Z_{bcp_{rpt}}^{hs2}$ = a vector of trade facilitation measures at BCP level

TP, a vector of trade policy measures in terms of normalized frequency at HS2 level of SPS or TBT measures

$ProdType$ = a dummy variable for products at HS 2-digit level to classify whether they are non-perishable goods (= 0) or perishable (= 1)

F_r^{hs} and F_p^{hs}, vectors of time-invariant country fixed effects interacted with products at HS2 level or country – sector fixed effects to control for time-invariant sector-specific factors of a country

F_{rt} and F_{pt}, country – year fixed effects to control for time varying country specific factors such as market size for importers and output, technology, and prices for exporters

F_{rp}^{hs}, vector of reporter – partner fixed effects to control for time-invariant country pair trade costs (e.g., distance between countries)

$F_{BCP_{rp}}$, vector of BCPs to control for trade intensities at each BCP.

By interacting $ProdType$ with $Z_{bcp_{rpt}}^{hs2}$ and TP, respectively, we can determine the marginal effect on CAREC intra-regional trade of at-the-border and behind-the-border costs of perishable goods trade.

Table 1: PPML estimation with fixed effects by exporter, importer, product at HS2 level, and year - Impact of non-tariff measures (NTM) and average time and cost at outbound border crossing points of perishable goods (HS2 level) on CAREC intraregional trade

Dependent Variable: imports ($) in level	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
NTM Variables	SPS/TBT	SPS/TBT	SPS/TBT	SPS/TBT	SPS/TBT	SPS/TBT	SPS/TBT	SPS/TBT	SPS/TBT
NTM Variable Type	All	Product Characteristics	Conformity Assessment	All	Product Characteristics	Conformity Assessment	All	Product Characteristics	Conformity Assessment
Average time at outbound BCP; hours	0.0109	0.0103	0.0130**				0.00943*	0.00876*	0.0137***
	(0.00677)	(0.00694)	(0.00623)				(0.00496)	(0.00528)	(0.00456)
Perishable goods dummy (= 1 perishable; = 0 non-perishable)	0.0225	0.0648	0.0147	0.978**	1.027**	0.685*	-0.599*	-0.532	-0.230
	(0.327)	(0.333)	(0.356)	(0.474)	(0.468)	(0.362)	(0.329)	(0.336)	(0.429)
Perishable goods dummy X Average time at outbound BCP	0.0488***	0.0503***	0.0336***				0.0531***	0.0546***	0.0245**
	(0.00472)	(0.00515)	(0.00780)				(0.0134)	(0.0148)	(0.0107)
Average cost at outbound BCP; US$	-0.000249	-0.000242	-0.000269	-0.000189	-0.000179	-0.000196			
	(0.000229)	(0.000228)	(0.000227)	(0.000207)	(0.000200)	(0.000208)			
Perishable goods dummy X Average cost at outbound BCP	-0.00119**	-0.00130**	-0.000683	-0.000359	-0.000319	-0.000384			
	(0.000481)	(0.000511)	(0.000483)	(0.000638)	(0.000592)	(0.000683)			
Normalized SPS frequency measure	0.237***	0.394***	0.860**	0.249***	0.415***	0.960**	0.251***	0.374***	1.125**
	(0.0816)	(0.114)	(0.403)	(0.0819)	(0.118)	(0.405)	(0.0778)	(0.105)	(0.438)
Perishable goods dummy X Normalized SPS frequency measure	-0.117**	-0.226**	-0.278	-0.208***	-0.410***	-0.359	-0.00210	-0.0330	0.0112
	(0.0586)	(0.104)	(0.212)	(0.0670)	(0.119)	(0.269)	(0.0237)	(0.0798)	(0.0995)
Normalized TBT frequency measure	0.00197	-0.0152	0.0333	0.0308	0.0197	0.138	-0.0654	-0.159	-0.0352
	(0.115)	(0.189)	(0.270)	(0.114)	(0.189)	(0.241)	(0.104)	(0.165)	(0.235)
Perishable goods dummy X Normalized TBT frequency measure	-0.0651	-0.103	0.128	0.0826	0.198	0.360	-0.0458	0.000564	0.306
	(0.212)	(0.496)	(0.329)	(0.162)	(0.298)	(0.242)	(0.244)	(0.632)	(0.324)
Ln(Distance)	-0.0680	-0.0605	-0.0776*	-0.0802	-0.0660	-0.116**	-0.0630*	-0.0624	-0.0431
	(0.0520)	(0.0575)	(0.0464)	(0.0672)	(0.0757)	(0.0530)	(0.0362)	(0.0381)	(0.0375)
Common Colonizer (=1; 0 otherwise)	0.0965	0.0255	0.182	0.345	0.214	0.609**	0.284	0.277	0.185
	(0.353)	(0.383)	(0.289)	(0.330)	(0.388)	(0.239)	(0.256)	(0.272)	(0.211)
Common Language (=1; 0 otherwise)	1.633	1.372	1.933	1.825	1.615*	2.268	1.556	0.990*	2.992
	(1.218)	(0.916)	(1.880)	(1.203)	(0.952)	(2.058)	(1.025)	(0.565)	(2.351)
Country pair currently has RTA (=1; 0 otherwise)	0.0240	-0.0368	0.131	-0.136	-0.216	0.0480	-0.244	-0.288	-0.225
	(0.345)	(0.378)	(0.305)	(0.355)	(0.409)	(0.285)	(0.192)	(0.190)	(0.195)
Constant	19.38***	19.27***	19.58***	19.75***	19.63***	20.01***	18.66***	18.81***	18.37***
	(0.174)	(0.164)	(0.368)	(0.142)	(0.134)	(0.389)	(0.324)	(0.270)	(0.457)
Observations	514	514	514	514	514	514	602	602	602
Pseudo R-squared	0.890	0.891	0.887	0.881	0.883	0.881	0.874	0.872	0.877

Table 2: PPML estimation with fixed effects by exporter, importer, product at HS2 level, and year - Impact of non-tariff measures (NTM) and average time and cost at inbound border crossing points of perishable goods (HS2 level) on CAREC intraregional trade

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NTM Variable Type	All	Product Characteristics	Conformity Assessment	All	Product Characteristics	Conformity Assessment	All	Product Characteristics	Conformity Assessment
Average time at inbound BCP; hours	-0.0274	-0.0338*	-0.0137				-0.0279*	-0.0328*	-0.00654
	(0.0181)	(0.0197)	(0.0168)				(0.0159)	(0.0175)	(0.0163)
Perishable goods dummy (= 1 perishable; = 0 non-perishable)	0.878	0.983	0.621	1.167	1.286	0.582	0.0565	0.153	0.0292
	(0.609)	(0.603)	(0.716)	(0.807)	(0.847)	(0.731)	(0.453)	(0.429)	(0.559)
Perishable goods dummy X Average time at inbound BCP	0.111***	0.109***	0.0740**				0.0836***	0.0812***	0.0508***
	(0.0315)	(0.0381)	(0.0311)				(0.0221)	(0.0256)	(0.0175)
Average cost at inbound BCP; US$	0.00272***	0.00298***	0.00254***	0.00224***	0.00254***	0.00188**			
	(0.000703)	(0.000707)	(0.000830)	(0.000797)	(0.000864)	(0.000770)			
Perishable goods dummy X Average cost at inbound BCP	-0.00335	-0.00336	-0.00239	-7.30e-05	2.06e-05	-0.000548			
	(0.00337)	(0.00358)	(0.00317)	(0.00396)	(0.00387)	(0.00365)			
Normalized SPS frequency measure	0.286***	0.441***	1.151***	0.260***	0.397***	1.181***	0.271***	0.412***	1.113***
	(0.0784)	(0.108)	(0.431)	(0.0729)	(0.100)	(0.426)	(0.0765)	(0.104)	(0.421)
Perishable goods dummy X Normalized SPS frequency measure	-0.0562*	0.0297	-0.307	-0.115***	-0.237***	-0.146	-0.0299	0.00641	-0.149
	(0.0311)	(0.140)	(0.197)	(0.0398)	(0.0618)	(0.160)	(0.0315)	(0.128)	(0.124)
Normalized TBT frequency measure	0.00844	-0.0274	0.0633	-0.00603	-0.0808	0.125	-0.00179	-0.0475	0.0142
	(0.115)	(0.187)	(0.229)	(0.115)	(0.193)	(0.234)	(0.103)	(0.171)	(0.187)
Perishable goods dummy X Normalized TBT frequency measure	-0.827**	-1.752	-0.733	0.0515	0.200	0.402	-0.535	-1.028	-0.319
	(0.387)	(1.190)	(0.482)	(0.207)	(0.363)	(0.304)	(0.339)	(0.980)	(0.292)
Ln(Distance)	-0.0679	-0.0567	-0.0870	-0.0791	-0.0693	-0.0865	-0.0549	-0.0476	-0.0866**
	(0.0613)	(0.0660)	(0.0536)	(0.0618)	(0.0630)	(0.0566)	(0.0393)	(0.0448)	(0.0367)
Common Colonizer (=1; 0 otherwise)	0.435*	0.359	0.557***	0.462**	0.385*	0.543***	0.390**	0.336	0.587***
	(0.255)	(0.297)	(0.194)	(0.187)	(0.199)	(0.169)	(0.194)	(0.242)	(0.156)
Common Language (=1; 0 otherwise)	1.655	1.049	2.983	1.896*	1.427**	3.482	1.641	1.044	2.960
	(1.304)	(0.762)	(2.903)	(1.037)	(0.664)	(2.770)	(1.097)	(0.638)	(2.536)
Country pair currently has RTA (=1; 0 otherwise)	-0.245	-0.291	-0.185	-0.395***	-0.453***	-0.346**	-0.280	-0.319	-0.218
	(0.207)	(0.200)	(0.182)	(0.135)	(0.138)	(0.148)	(0.227)	(0.232)	(0.204)
Constant	18.35***	18.42***	18.21***	18.29***	18.33***	18.14***	18.68***	18.78***	18.48***
	(0.230)	(0.216)	(0.321)	(0.203)	(0.189)	(0.301)	(0.222)	(0.214)	(0.289)
Observations	574	574	574	575	575	575	620	620	620
Pseudo R-squared	0.884	0.883	0.883	0.874	0.873	0.880	0.880	0.879	0.881

Table 3: PPML estimation using country-sector fixed effects - Impact of non-tariff measures and average time and cost at outbound border crossing points of perishable goods (HS2 level) on CAREC intraregional trade

Dependent Variable: imports ($) in level	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
NTM Variables	SPS/TBT	SPS/TBT	SPS/TBT	SPS/TBT	SPS/TBT	SPS/TBT	SPS/TBT	SPS/TBT	SPS/TBT
NTM Variable Classification	All	Product Characteristics	Conformity Assessment	All	Product Characteristics	Conformity Assessment	All	Product Characteristics	Conformity Assessment
Average time at outbound BCP; hours	-0.00419*	-0.00421*	-0.00420*				-0.00269	-0.00274	-0.00268
	(0.00219)	(0.00219)	(0.00218)				(0.00257)	(0.00257)	(0.00256)
Perishable goods dummy (= 1 perishable; = 0 non-perishable)	-0.0283	-0.0248	-0.0421	0.0483	0.0584	0.0300	-0.176**	-0.175**	-0.172**
	(0.0644)	(0.0628)	(0.0721)	(0.0449)	(0.0436)	(0.0517)	(0.0708)	(0.0683)	(0.0699)
Perishable goods dummy X Average time at outbound BCP	0.00690***	0.00712***	0.00653***				0.00600**	0.00632**	0.00582**
	(0.00154)	(0.00147)	(0.00192)				(0.00283)	(0.00296)	(0.00283)
Average cost at outbound BCP; US$	0.000142***	0.000142***	0.000142***	8.94e-05***	8.91e-05***	8.96e-05***			
	(2.82e-05)	(2.82e-05)	(2.81e-05)	(2.26e-05)	(2.27e-05)	(2.25e-05)			
Perishable goods dummy X Average cost at outbound BCP; US$	-0.000300***	-0.000312***	-0.000256***	-0.000168**	-0.000174**	-0.000139			
	(6.14e-05)	(6.32e-05)	(7.37e-05)	(8.36e-05)	(7.95e-05)	(8.66e-05)			
Normalized SPS frequency measure	4.046***	4.165***	NA	3.759***	3.862***	NA	-0.607	-0.475	NA
	(0.912)	(0.924)	NA	(0.994)	(1.007)	NA	(1.402)	(1.392)	NA
Perishable goods dummy X Normalized SPS frequency measure	-0.000310	-0.00263	0.0157	-0.00858	-0.0221	-0.00389	0.00657	0.0101	0.0318**
	(0.00650)	(0.0108)	(0.0327)	(0.00659)	(0.0156)	(0.0290)	(0.00412)	(0.00968)	(0.0126)
Normalized TBT frequency measure	0.329	NA	0.332	0.328	0.0877	0.330	0.267	NA	0.274
	(0.227)	NA	(0.226)	(0.225)	(0.0663)	(0.225)	(0.278)	NA	(0.276)
Perishable goods dummy X Normalized TBT frequency measure	0.0157	0.0240	0.0372**	0.0459**	NA	0.0896***	0.0232	0.0231	0.0441*
	(0.0131)	(0.0395)	(0.0163)	(0.0195)	NA	(0.0219)	(0.0188)	(0.0529)	(0.0244)
Ln(Distance)	-0.0719	-0.0721	-0.0738	-0.0533	-0.0531	-0.0553	0.0244	0.0234	0.0246
	(0.0627)	(0.0628)	(0.0620)	(0.0598)	(0.0598)	(0.0591)	(0.0380)	(0.0379)	(0.0371)
Common Colonizer (=1; 0 otherwise)	0.122	0.122	0.134	-0.0248	-0.0268	-0.0116	0.0148	0.0212	0.0134
	(0.225)	(0.225)	(0.220)	(0.207)	(0.207)	(0.202)	(0.163)	(0.164)	(0.158)
Common Language (=1; 0 otherwise)	0.126	0.140	0.112	0.163	0.179	0.148	0.257	0.260	0.259*
	(0.237)	(0.236)	(0.230)	(0.235)	(0.235)	(0.229)	(0.162)	(0.166)	(0.154)
Country pair currently has RTA (=1; 0 otherwise)	0.418	0.419	0.429	0.450	0.451	0.460	-0.109	-0.102	-0.111
	(0.360)	(0.361)	(0.356)	(0.347)	(0.347)	(0.343)	(0.210)	(0.210)	(0.204)
Constant	15.26***	16.93***	18.80***	15.48***	17.06***	18.79***	19.95***	19.46***	18.68***
	(0.812)	(0.465)	(0.114)	(0.895)	(0.500)	(0.112)	(3.610)	(2.101)	(0.0788)
Observations	399	399	399	399	399	399	484	484	484

Table 4: PPML estimation using country-sector fixed effects - Impact of non-tariff measures and average time and cost at inbound border crossing points of perishable goods (HS2 level) on CAREC intraregional trade

Dependent Variable: imports ($) in level	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
NTM Variables	SPS/TBT	SPS/TBT	SPS/TBT	SPS/TBT	SPS/TBT	SPS/TBT	SPS/TBT	SPS/TBT	SPS/TBT
NTM Variable Classification	All	Product Characteristics	Conformity Assessment	All	Product Characteristics	Conformity Assessment	All	Product Characteristics	Conformity Assessment
Average time at inbound BCP; hours	-0.00487	-0.00494	-0.00475				0.000881	0.00101	0.000673
	(0.0134)	(0.0134)	(0.0134)				(0.0163)	(0.0164)	(0.0161)
Perishable goods dummy (= 1 perishable; = 0 non-perishable)	0.0892	0.0991	0.0755	0.0763	0.0719	0.0825	-0.151	-0.144	-0.160
	(0.105)	(0.103)	(0.0987)	(0.121)	(0.108)	(0.119)	(0.106)	(0.101)	(0.109)
Perishable goods dummy X Average time at inbound BCP	0.0121	0.0123*	0.0125*				0.0144*	0.0131*	0.0166**
	(0.00747)	(0.00705)	(0.00681)				(0.00818)	(0.00759)	(0.00807)
Average cost at outbound BCP; US$	0.000396	0.000374	0.000388	0.000271	0.000238	0.000279			
	(0.000773)	(0.000764)	(0.000772)	(0.000791)	(0.000788)	(0.000782)			
Perishable goods dummy X Average cost at inbound BCP; US$	-0.000845	-0.000890	-0.000794	-0.000471	-0.000366	-0.000549			
	(0.000610)	(0.000604)	(0.000578)	(0.000658)	(0.000585)	(0.000649)			
Normalized SPS frequency measure	0.240	0.522	NA	-0.640	-0.565	NA	-0.106	0.0465	NA
	(1.206)	(1.223)	NA	(1.507)	(1.467)	NA	(1.100)	(1.116)	NA
Perishable goods dummy X Normalized SPS frequency measure	-0.00459	0.00354	-0.0324	-0.00607	-0.0135	-0.00547	0.00722	0.0248	-0.00647
	(0.00560)	(0.00995)	(0.0251)	(0.00680)	(0.0191)	(0.0170)	(0.00660)	(0.0155)	(0.0205)

Table 5: PPML estimation with country pair and country-year fixed effects - Impact of non-tariff measures and average time and cost at outbound border crossing points of perishable goods (HS2 level) on CAREC intraregional trade

Dependent Variable: imports ($) in level	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
NTM Variables	Model 1 SPS/TBT	Model 2 SPS/TBT	Model 3 SPS/TBT	Model 4 SPS/TBT	Model 5 SPS/TBT	Model 6 SPS/TBT	Model 7 SPS/TBT	Model 8 SPS/TBT	Model 9 SPS/TBT
NTM Variable Type	All	Product Characteristics	Conformity Assessment	All	Product Characteristics	Conformity Assessment	All	Product Characteristics	Conformity Assessment
Average time at outbound BCP; hours	0.00523	0.00503	0.00605				0.00505	0.00414	0.00795
	(0.00984)	(0.0101)	(0.00938)				(0.00988)	(0.00994)	(0.0104)
Perishable goods dummy (= 1 perishable; = 0 non-perishable)	-1.270**	-1.271**	-1.286***	-0.578	-0.530	-0.836**	-1.480***	-1.523***	-1.454***
	(0.529)	(0.542)	(0.490)	(0.481)	(0.503)	(0.366)	(0.472)	(0.512)	(0.452)
Perishable goods dummy X Average time at outbound BCP; hours	0.0495***	0.0503**	0.0477**				0.0487***	0.0518***	0.0357
	(0.0181)	(0.0196)	(0.0189)				(0.0166)	(0.0168)	(0.0233)
Average cost at outbound BCP; US$	-0.000181***	-0.000177***	-0.000202***	-0.000159	-0.000153	-0.000184			
	(4.84e-05)	(4.88e-05)	(5.69e-05)	(0.000112)	(0.000108)	(0.000126)			
Perishable goods dummy X Average cost at outbound BCP; US$	-0.000578	-0.000698	-0.000422	-0.000123	-0.000132	-0.000177			
	(0.000605)	(0.000649)	(0.000577)	(0.000823)	(0.000883)	(0.000755)			
Normalized SPS frequency measure	0.0207	0.144*	-0.380	0.0232	0.145*	-0.363	0.0839	0.178***	0.0803
	(0.0994)	(0.0833)	(0.791)	(0.0994)	(0.0838)	(0.801)	(0.0585)	(0.0644)	(0.492)
Perishable goods dummy X Normalized SPS frequency measure	-0.0154	-0.150	0.424	-0.0689	-0.277*	0.493	0.0243	-0.0339	0.415
	(0.0965)	(0.126)	(0.749)	(0.0951)	(0.144)	(0.771)	(0.0337)	(0.0649)	(0.308)
Normalized TBT frequency measure	-0.116	-0.248	-0.156	-0.113	-0.250	-0.127	-0.157	-0.291*	-0.280
	(0.100)	(0.165)	(0.176)	(0.100)	(0.163)	(0.184)	(0.0955)	(0.160)	(0.195)
Perishable goods dummy X Normalized TBT frequency measure	0.219**	0.521***	0.316**	0.344***	0.711**	0.754***	0.268***	0.599***	0.650**
	(0.0915)	(0.184)	(0.140)	(0.127)	(0.296)	(0.189)	(0.0745)	(0.178)	(0.299)
Constant	18.90***	18.93***	18.90***	18.94***	18.97***	18.94***	18.75***	18.80***	18.68***
	(0.166)	(0.164)	(0.153)	(0.121)	(0.108)	(0.133)	(0.212)	(0.222)	(0.232)

Table 6: PPML estimation with country pair and country-year fixed effects - Impact of non-tariff measures and average time and cost at inbound border crossing points of perishable goods (HS2 level) on CAREC intraregional trade

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
NTM Variables	SPS/TBT	SPS/TBT	SPS/TBT	SPS/TBT	SPS/TBT	SPS/TBT	SPS/TBT	SPS/TBT	SPS/TBT
NTM Variable Type	All	Product Characteristics	Conformity Assessment	All	Product Characteristics	Conformity Assessment	All	Product Characteristics	Conformity Assessment
Average time at inbound BCP; hours	-0.0100	-0.0139	-0.00178				-0.00144	-0.00415	0.00670
	(0.0212)	(0.0217)	(0.0160)				(0.0194)	(0.0205)	(0.0162)
Perishable goods dummy (= 1 perishable; = 0 non-perishable)	-1.010***	-0.923***	-1.460***	-0.643	-0.529	-1.301***	-1.208***	-1.150***	-1.445***
	(0.214)	(0.286)	(0.352)	(0.432)	(0.505)	(0.251)	(0.331)	(0.356)	(0.427)
Perishable goods dummy X Average time at inbound BCP; hours	0.0697*	0.0684*	0.0595				0.0664***	0.0640**	0.0609**
	(0.0392)	(0.0411)	(0.0372)				(0.0252)	(0.0262)	(0.0242)
Average cost at inbound BCP; US$	0.00252	0.00260	0.00224	0.00268	0.00278	0.00230			
	(0.00233)	(0.00243)	(0.00212)	(0.00238)	(0.00244)	(0.00221)			
Perishable goods dummy X Average cost at inbound BCP; US$	-0.00128	-0.00170	-0.000143	0.000959	0.000734	0.00158			
	(0.00488)	(0.00522)	(0.00427)	(0.00467)	(0.00480)	(0.00425)			
Normalized SPS frequency measure	0.0976	0.200***	0.121	0.0909	0.188***	0.111	0.0925	0.191***	0.112
	(0.0612)	(0.0661)	(0.518)	(0.0589)	(0.0635)	(0.503)	(0.0599)	(0.0652)	(0.507)
Perishable goods dummy X									

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Conclusion

- Overall, our study yields empirical evidence that while the length of time and cost of clearing goods at the border may still negatively impact intraregional to a certain extent, it is behind-the-border measures that have pervasive and far-reaching impacts on intra-regional trade in CAREC.

- Hence, while these relevant measures are not captured by CPMM TFIs, they play an important role in bilateral trade flows. This underscores the importance of structural reforms in facilitating trade such as bolstering capability and capacity in sanitary and phytosanitary laboratories, and modernizing regulations to achieve international standards.

ADB