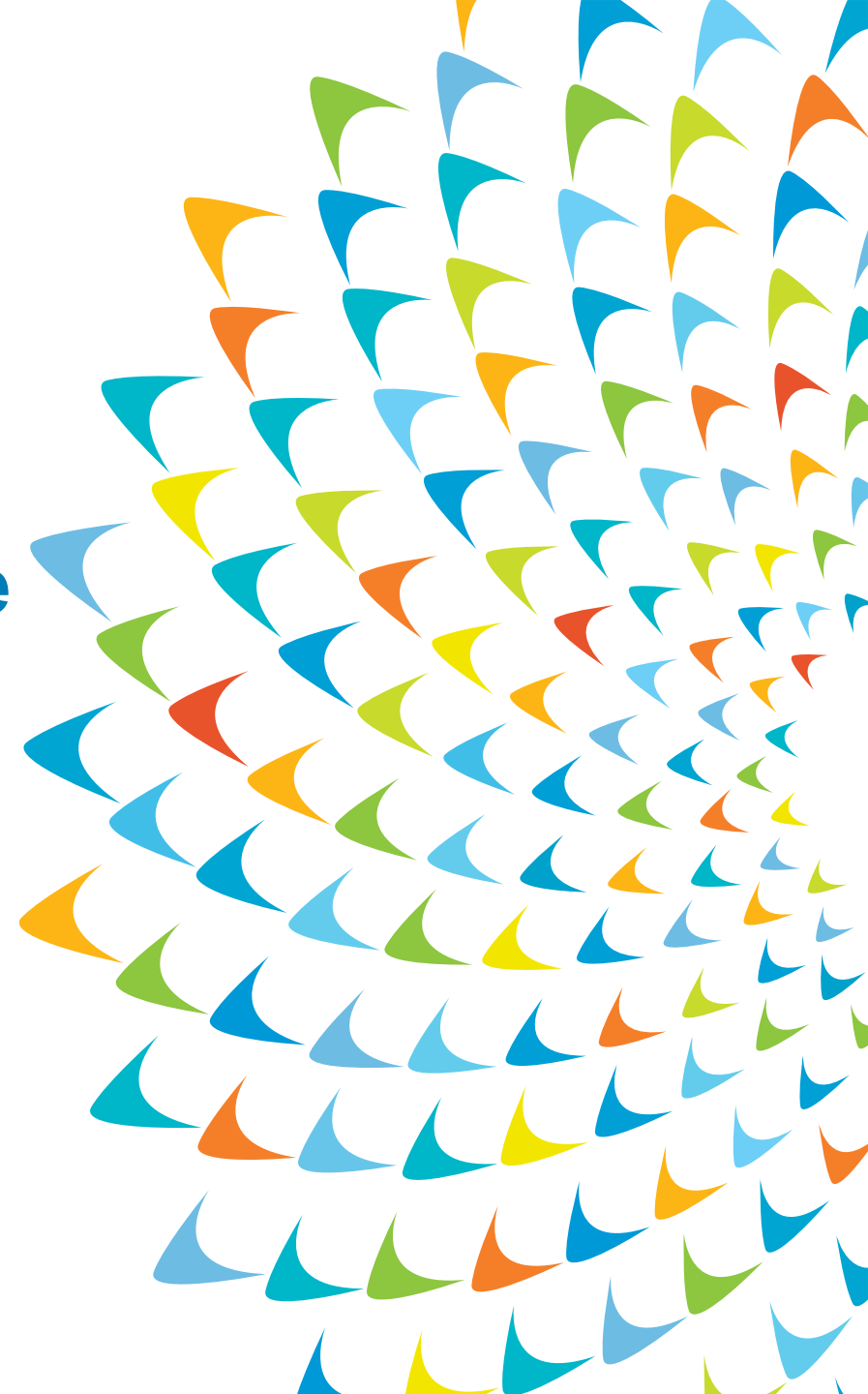




Impact of Non-Tariff Measures and Border Crossing Time and Costs: The Case of Perishable Goods Trade in the Central Asia Regional Economic Cooperation Region (CAREC)

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Research question

- What is the separate and distinct impacts of **at the border** and **behind the border** measures on intraregional trade, particularly for **perishable goods**?



Trade Facilitation (TF)

- **At-the-border measures**

- **Road transport:** Border security/control; Customs control; Commercial inspection; Health/Quarantine; Phytosanitary inspection; Veterinary inspection; visa/immigration; Transit conformity; Traffic inspection; Police inspection/stop, etc.
- **Rail transport:** Load/unload/remove excess cargo; Waiting for priority trains to pass.

- **Behind-the-border measures**

- Regulations and non-tariff measures (NTMs)
 - Sanitary and phytosanitary (SPS)
 - Technical Barriers to Trade (TBT)

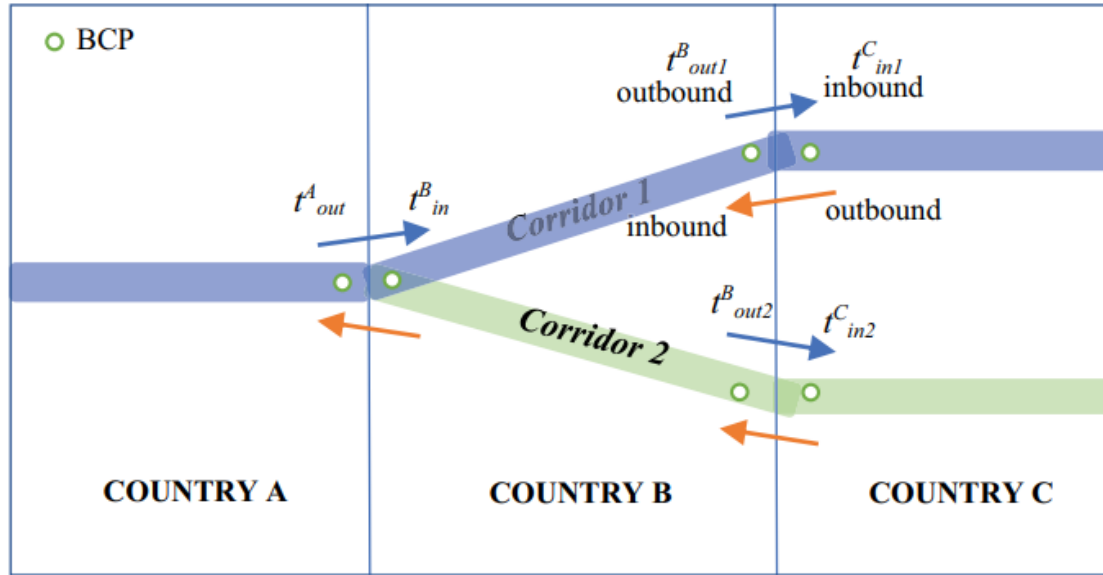


Importance of TF in CAREC perishable goods trade

- Several CAREC economies are landlocked (e.g., Kyrgyz Republic, Tajikistan, and Uzbekistan).
 - Lack of direct sea access, impacting their external trade and economic development.
 - Face the challenge of long overland distances, especially in reaching ports for international shipping.
 - Heavily depend on transit countries to access global markets.
 - Landlocked nations navigate complex non-tariff measures and bear high at-the-border time and trade costs.
- Higher trade time and costs pose significant challenges for perishable goods.
 - The increased cost of exporting these goods to other regions has prompted these countries to engage in greater perishable goods trade among themselves.
 - Perishable goods in intraregional trade has increased from 9.7% in 2018 to 14.2% in 2021



CPMM Trade Facilitation Indicators



BCP = border crossing point.

Source: Kim et al. (2020).

TFI1

Time taken to clear a BCP
in hours

TFI2

Costs incurred at a BCP
in \$

TF3

Costs incurred while traveling along a corridor section,
in \$

TFI4

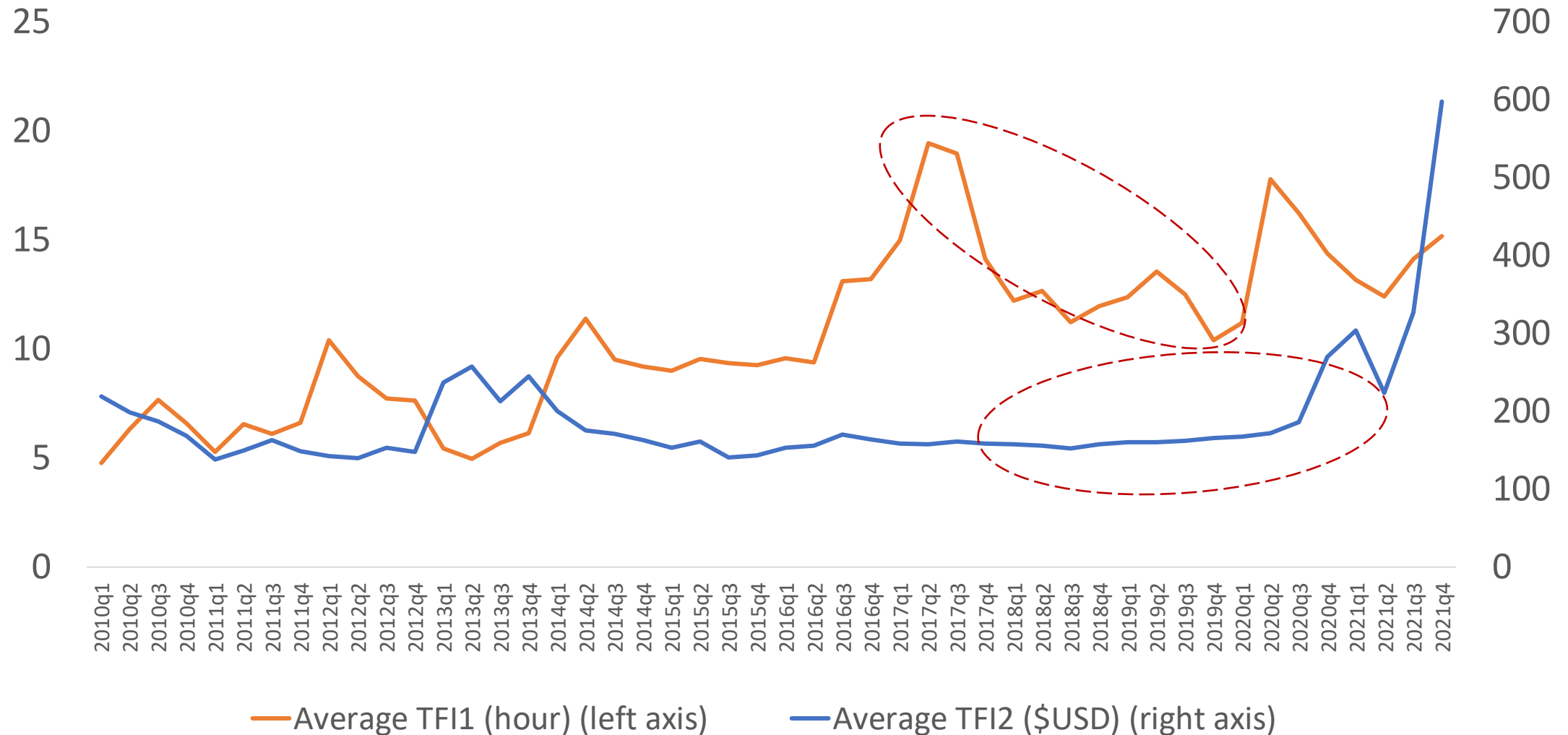
Speed of travel along a corridor section
(Speed with delay), *in km/h*

SWOD

Speed without delay,
in km/h

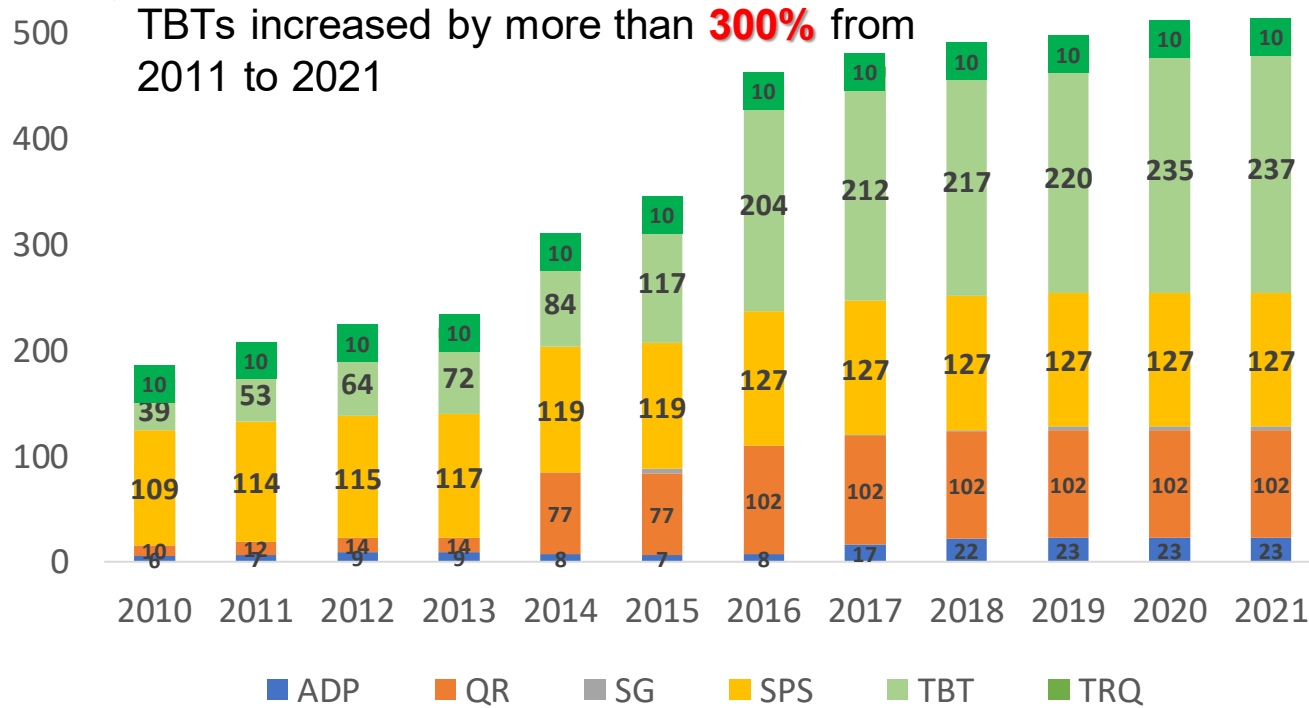


Time to clear a BCP (TFI1, in hours) vs Cost incurred at BCP (TFI2, in \$)



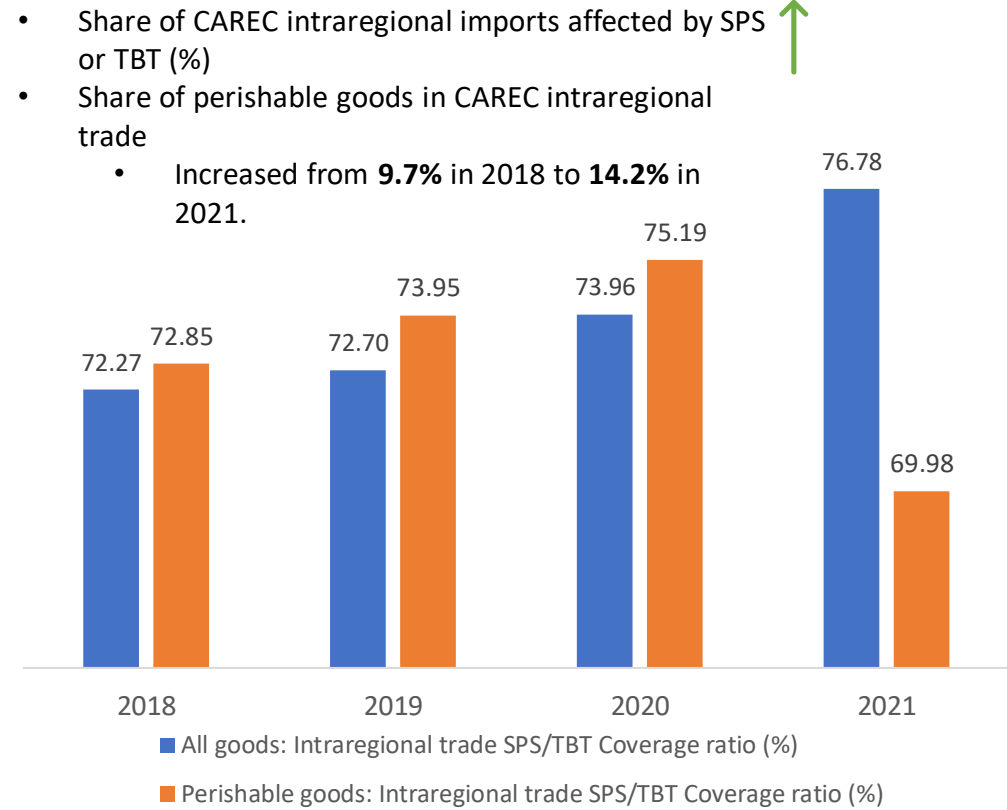


Number of NTMs Affecting Intraregional CAREC Trade



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

CAREC Intraregional trade coverage ratio (%)



Note: Perishable goods are goods that require
Source: Author's calculations using UN COMTRADE and UNCTAD NTM Database.

- At the border: Time and costs at BCP ↓ Behind the border: Non-tariff measures ↑

Data coverage: Year – 2018 to 2021; Countries – All CAREC economies.



$$Y_{ijt}^{hs2} = \alpha + \lambda \mathbf{Z}_{bcpijt}^{hs2} + \gamma \mathbf{TP}_{ijt}^{hs2} + \delta_{ij} F_{ij} + \delta_{it} F_{it} + \delta_{jt} F_{jt} + \delta_{BCP_{ij}} F_{BCP_{ij}} + \varepsilon_{ijt}^{hs2}$$

\mathbf{Z} = vector of trade facilitation measures in time and cost at inbound BCP

\mathbf{TP} = vector of SPS and TBT proxies (i.e., count/frequency)

\mathbf{F} = various fixed effects

= **exporter-importer fixed effects:** control for country pair time-invariant factor (e.g., bilateral trade costs such as distance, common language, shared borders, trade policies that do not change over time)

= **exporter-product-year fixed effects:** allows the analysis to focus on the impact of importer-specific factors (e.g., NTMs)

Estimation technique to address heteroskedasticity and zero trade flows: Poisson Pseudo-Maximum Likelihood Estimator (PPML)



Proxies for Sanitary and Phytosanitary Measures and Technical Barriers to Trade and Examined Impacts

Proxies	Interpretation
$SPS(TBT)count_{ijtHS2}$	<p>Number of shared SPS and TBT measures imposed.</p> <ul style="list-style-type: none"> captures the mean effect of imposing one additional NTM to the already existing stock of NTMs applied in the bilateral relationship
$SPS(TBT)Normalized\ Frequency_{ijtHS2}$	<p>Number of shared SPS and TBT measures imposed divided by the number of products under HS2.</p> <ul style="list-style-type: none"> Shows how the prevalence of NTMs within a product category (HS2 level) affects trade imports Mitigate size bias: Without this adjustment, categories with more products would naturally tend to have more NTMs, simply due to their size.



Base Model Results

	(1)	(2)	(3)	(4)	(5)	(6)
	$SPS(TBT)count_{ijtHS2}$			$SPS(TBT)Normalized\ Frequency_{ijtHS2}$		
	All Goods	Perishable Goods	Non-Perishable Goods	All Goods	Perishable Goods	Non-Perishable Goods
<i>Average time at inbound BCPs (hours)_{HS2}</i>	-0.00510	0.0134	-0.00713***	-0.00417	0.0109	-0.00298
	(0.00329)	(0.0130)	(0.00200)	(0.00379)	(0.0114)	(0.00433)
<i>Average cost at inbound BCPs (USD \$)_{HS2}</i>	-0.000945***	0.00280	-0.000922***	-0.000967***	0.00285	-0.000963***
	(0.000262)	(0.00317)	(0.000268)	(0.000245)	(0.00313)	(0.000251)
<i>SPS Proxies</i>	0.000673	-0.000395	-0.00982***	0.0308	0.207*	-1.007**
	(0.00172)	(0.000765)	(0.00328)	(0.0776)	(0.118)	(0.447)
<i>TBT Proxies</i>	0.00105*	0.00879***	0.000776	0.144**	0.540***	0.197*
	(0.000627)	(0.00226)	(0.000615)	(0.0657)	(0.137)	(0.104)
Constant	19.39***	17.35***	19.64***	19.42***	14.82***	19.57***
	(0.176)	(0.750)	(0.121)	(0.131)	(1.395)	(0.0814)
Observations	448	149	298	448	149	298
Pseudo R-squared	0.948	0.956	0.948	0.948	0.957	0.948



Estimated effects of SPS and TBT measures according to conformity assessment and product characteristics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	All Goods	Perishable Goods	Non-Perishable Goods	All Goods	Perishable Goods	Non-Perishable Goods	All Goods	Perishable Goods	Non-Perishable Goods	All Goods	Perishable Goods	Non-Perishable Goods
<i>Average time at inbound BCPs (hours)_{HS2}</i>	-0.00682	0.0141	-0.0101**	-0.00818*	0.0122	-0.0120**	-0.00597*	0.0131	-0.00786***	-0.00436	0.0100	-0.00193
	(0.00477)	(0.0137)	(0.00465)	(0.00472)	(0.0126)	(0.00560)	(0.00334)	(0.0127)	(0.00212)	(0.00377)	(0.0107)	(0.00469)
<i>Average cost at inbound BCPs (USD \$)_{HS2}</i>	-0.000923***	0.00262	-0.000927***	-0.000919***	0.00273	-0.000926***	-0.000942***	0.00267	-0.000912***	-0.000983***	0.00293	-0.000958***
	(0.000249)	(0.00296)	(0.000250)	(0.000248)	(0.00318)	(0.000244)	(0.000254)	(0.00289)	(0.000261)	(0.000244)	(0.00317)	(0.000254)
<i>SPS_ca_count_{ijtHS2}</i>	-0.00465	-0.00823	-0.0210***									
	(0.00499)	(0.00786)	(0.00390)									
<i>TBT_ca_count_{ijtHS2}</i>	0.000452	0.0130***	-1.07e-05									
	(0.00177)	(0.00493)	(0.00195)									
<i>SPS_ca_Freq_{ijtHS2}</i>				-0.224	0.419	-0.855***						
				(0.251)	(0.476)	(0.154)						
<i>TBT_ca_Freq_{ijtHS2}</i>				-0.0462	0.843**	-0.0954						
				(0.156)	(0.398)	(0.191)						
<i>SPS_pc_count_{ijtHS2}</i>							0.00240	0.00500	-0.0206***			
							(0.00297)	(0.00642)	(0.00768)			
<i>TBT_pc_count_{ijtHS2}</i>							0.00162	0.0186*	0.00131			
							(0.00102)	(0.00984)	(0.00107)			
<i>SPS_pc_Freq_{ijtHS2}</i>										0.106	0.294***	-4.069***
										(0.116)	(0.101)	(1.099)
<i>TBT_pc_Freq_{ijtHS2}</i>										0.322**	0.873***	0.526**
										(0.158)	(0.158)	(0.228)
Constant	19.68***	18.93***	19.79***	19.72***	16.30***	19.83***	19.32***	15.02***	19.61***	19.29***	14.83***	19.39***
	(0.107)	(1.382)	(0.138)	(0.0751)	(1.440)	(0.0938)	(0.209)	(2.602)	(0.140)	(0.172)	(0.864)	(0.142)
Observations	448	149	298	448	149	298	448	149	298	448	149	298
Pseudo R-squared	0.948	0.956	0.947	0.948	0.955	0.947	0.949	0.957	0.948	0.949	0.957	0.950



Takeaways:

- Lower time and cost of trade at the border; higher behind-the-border measures.
- SPS measures enhance trade in perishable goods but not in non-perishable goods; TBT measures stimulate non-perishable goods trade.

Insights:

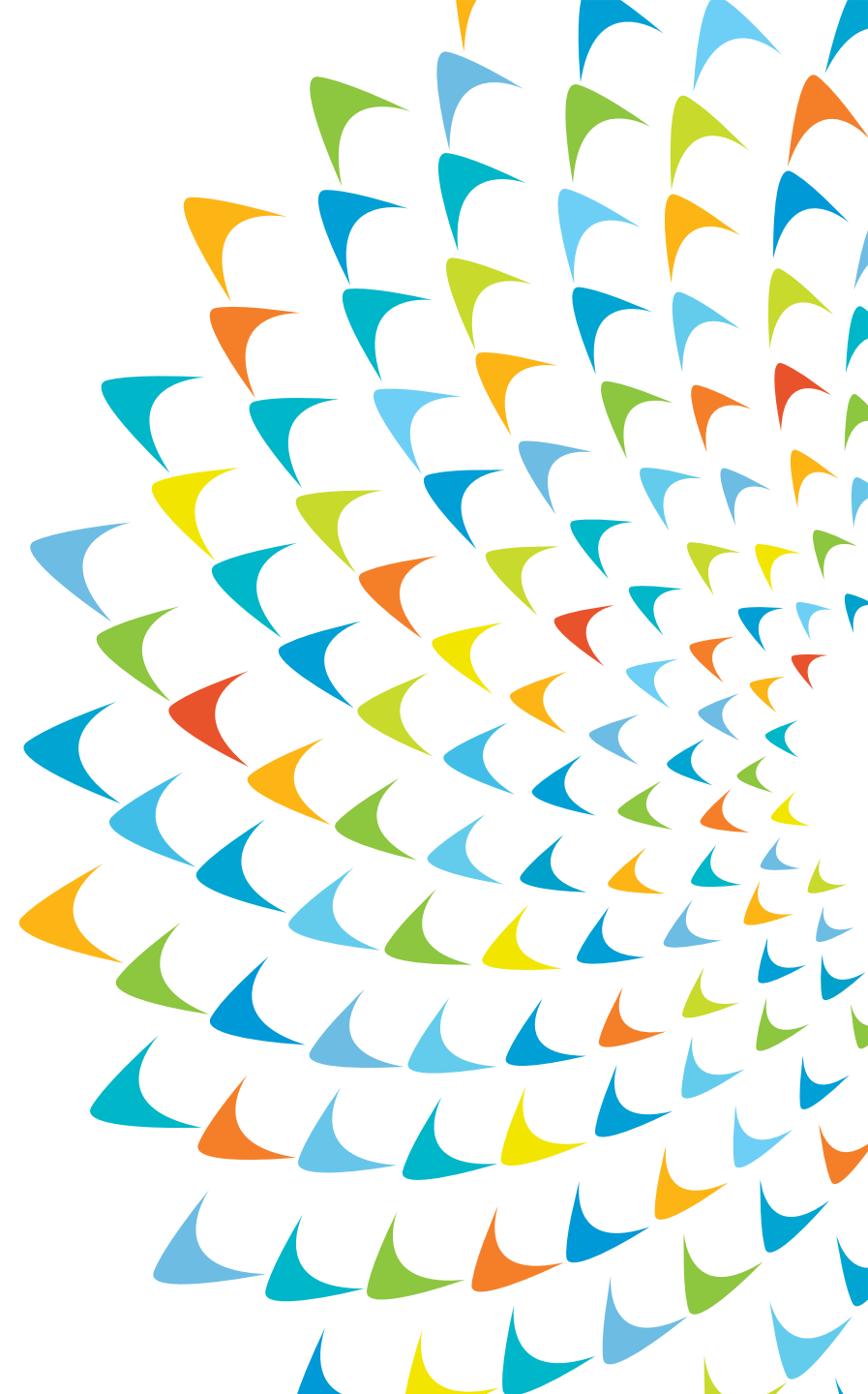
- More gains in implementing SPS and TBT on perishable goods and TBT on non-perishable goods.
 - Regulations that enhance consumers' trust stimulate trade.
- Findings complement Kim et al. (2021) and Baniya and Taniguchi (2022) which emphasize the importance of non-tariff measures in facilitating CAREC trade, alongside interventions in improving hard infrastructure.

Implications:

- Support more soft infrastructure interventions to trade facilitation in the CAREC region (Kim et al. 2021).
 - Streamline legal or institutional frameworks for trade logistics efficiency and quality of trade facilitation.
 - Improve domestic and structural reforms in facilitating trade and sanitary and phytosanitary laboratory capability and capacity.
- Promote RCI in adopting common standards and mutual recognition.
 - Findings of this study provide empirical support to ongoing efforts to establish the CAREC Free Trade Agreement.



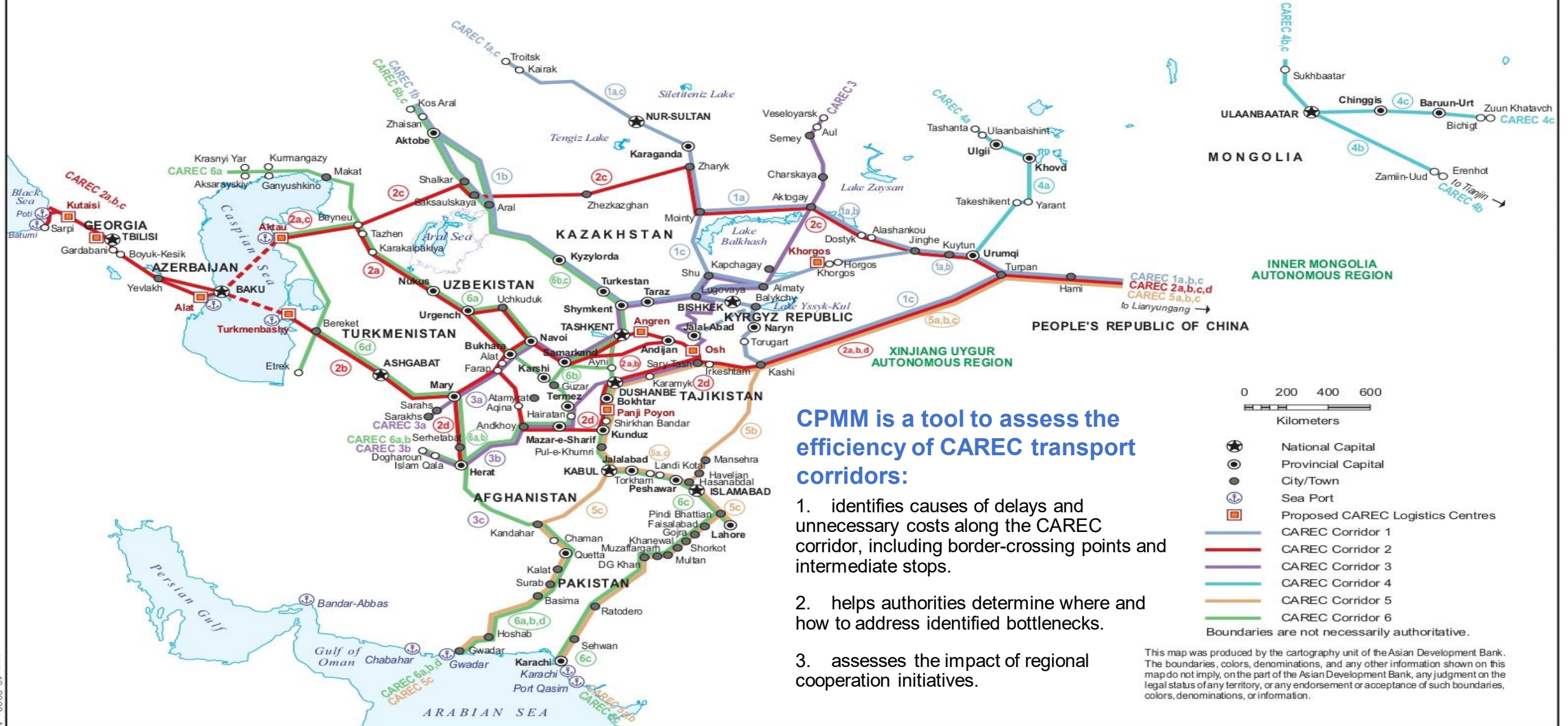
Thank you.



What is CPMM?

CAREC Corridor Performance Measurement and Monitoring (CPMM)

SIX CENTRAL ASIA REGIONAL ECONOMIC COOPERATION TRANSPORT CORRIDORS





Border-crossing delays

Road Transport

1. Border Security / Control
2. Customs Controls
3. Commercial Inspection
4. Health / Quarantine
5. Phyto-sanitary Inspection
6. Veterinary Inspection
7. Visa/Immigration
8. Transit Conformity
9. Traffic Inspection
10. Police Checkpoint / Stop
9. Transport Inspection
10. Weight/Standard Inspection
11. Vehicle Registration
12. Emergency Repair
13. Escort / Convoy
14. Loading / Unloading
15. Road/Bridge Toll
16. Waiting/ Queue

Rail Transport

1. Load Cargoes
2. Unload Cargoes
3. Fix Cargo Shift
4. Remove Excess Cargo
5. Transload at Gauge Change Point
6. Pick-up and Deliver Wagons
7. Replace/Repair Inoperable Wagon
8. Emergency Repair
9. Train Classification
10. Document Errors
11. Reissue Transit Documents
12. Customs Inspection
13. Technical Inspection
14. Commercial Inspection
15. Sanitary/Phyto-sanitary Control
16. Materials Transfer
17. Faulty handling equipment
18. No wagons available
19. Restriction on entry
20. Marshalling
21. Waiting for priority trains to pass