

The Effects of Non-Tariff Measures (NTMs) on Cambodia Agricultural Export: a Gravity Model

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Introduction

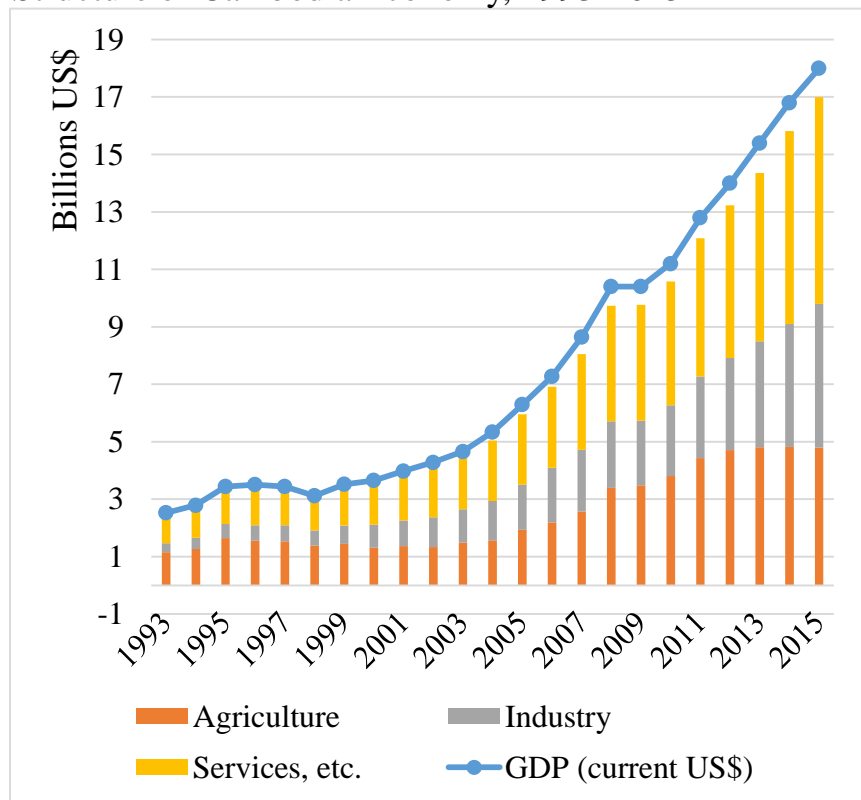
- During the last two decades, Cambodia's agricultural production and export of commodities such as rice, cassava, natural rubber, have expanded drastically, although it is still a small share in total export.
- However, it is observed that Cambodia still faces challenges in complying with stringent non-tariff measures (NTMs) imposed by importing countries, such as Sanitary and Phytosanitary (SPS) and Technical Barrier to Trade (TBT) on agricultural products.
- In Cambodia, the proportion of exporting companies affected by NTMs was 82.0 percent, which was the highest rate in ASEAN (ITC 2014). The average tariff equivalent of NTMs was 7.7 percent on Cambodia export to the EU, even with the duty-free access (Brenton 2003).

Research Question

- Previous research used survey-based or perception approach while the research used sound statistical data regarding NTMs imposing on Cambodia trade and their effects is not available.
- In order to fill this gap this research aims to identify the effects of NTMs on Cambodia's agricultural export. This research addresses the following research questions:
 1. What are the NTM coverage ratios on Cambodia agricultural export?
 2. What are the regulatory distances between Cambodia and her agricultural export partners?
 3. What are the most prevalent NTMs imposed on Cambodia's agricultural export by her trade partners?
 4. What are the effects of NTMs on Cambodia agricultural export?

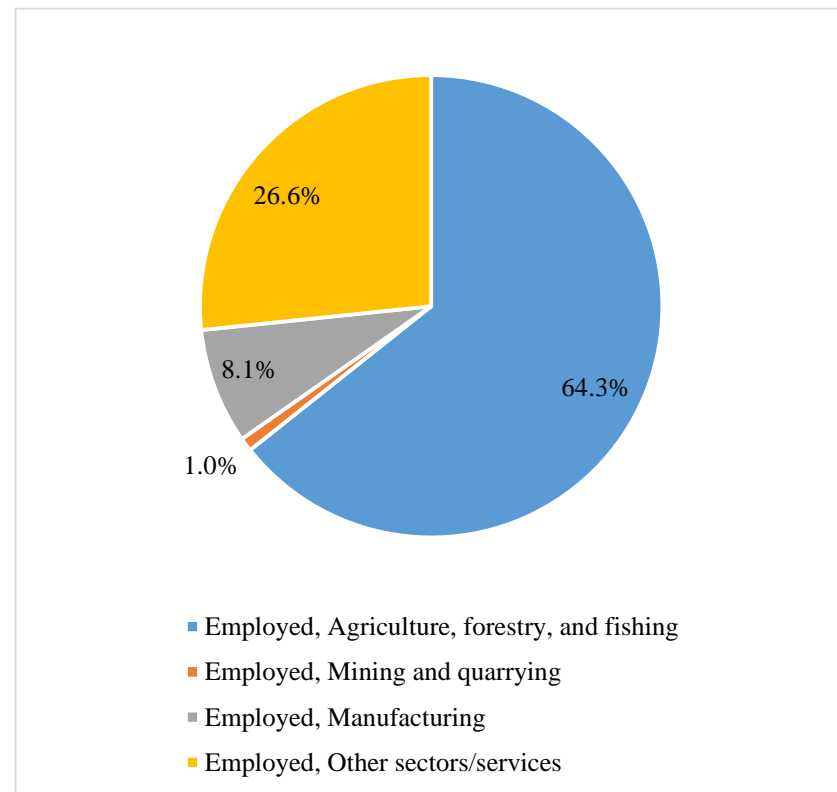
Agricultural Production (1)

Structure of Cambodia Economy, 1993-2015



Source: World Bank, World Development Indicators (WDI)

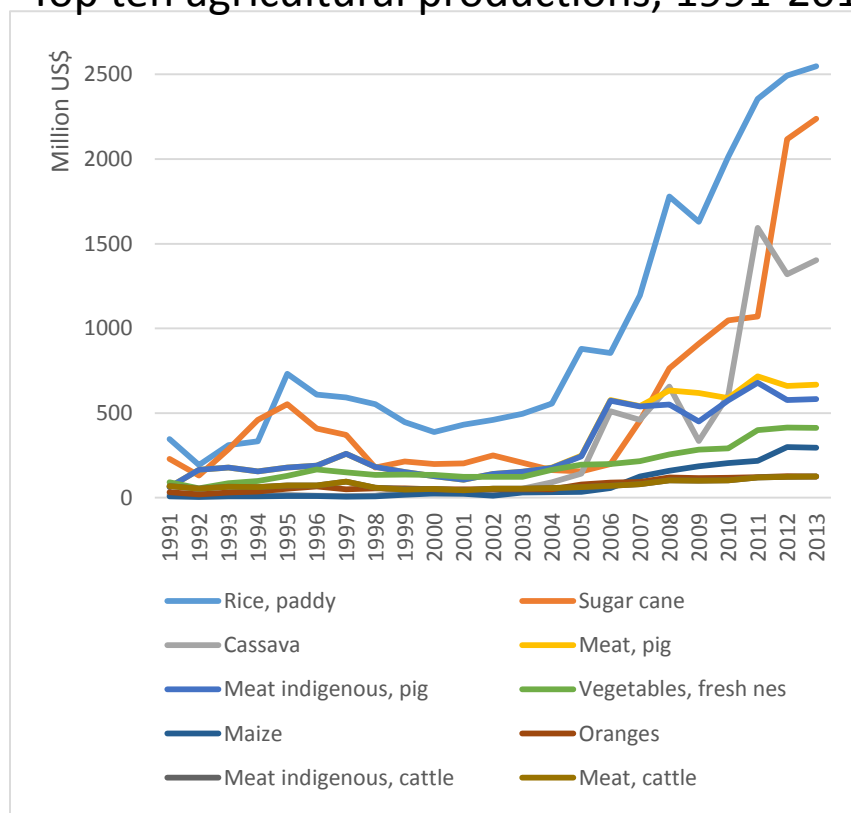
Labour force by sectors, 2014



Source: The Statistical Database System (SDBS) of ADB

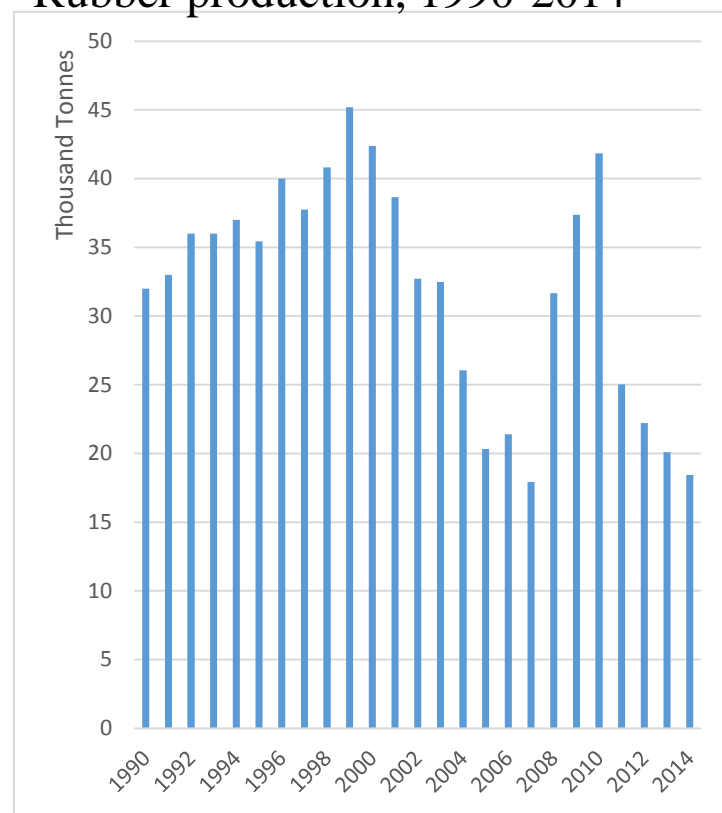
Agricultural Production (2)

Top ten agricultural productions, 1991-2013



Source: FAOSTAT

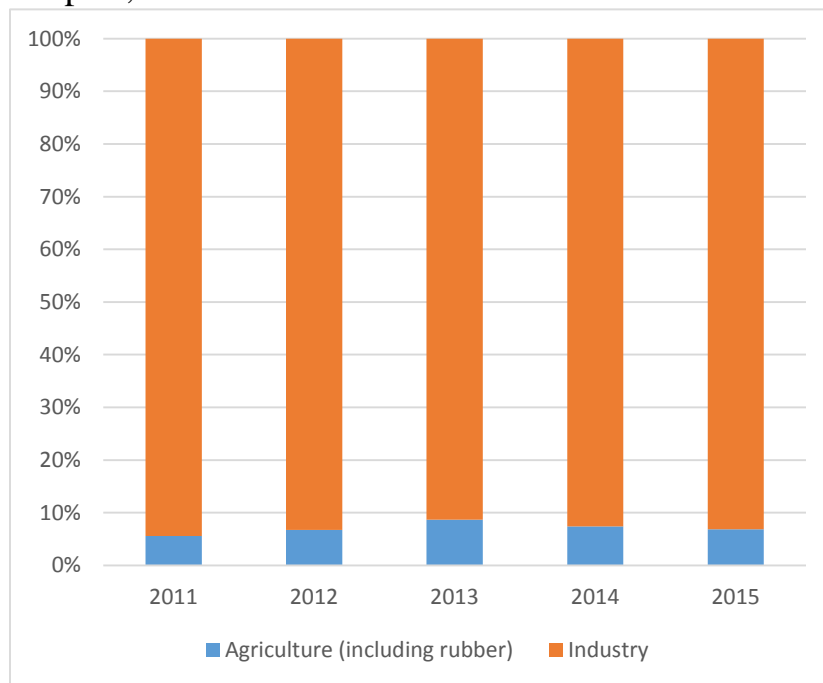
Rubber production, 1990-2014



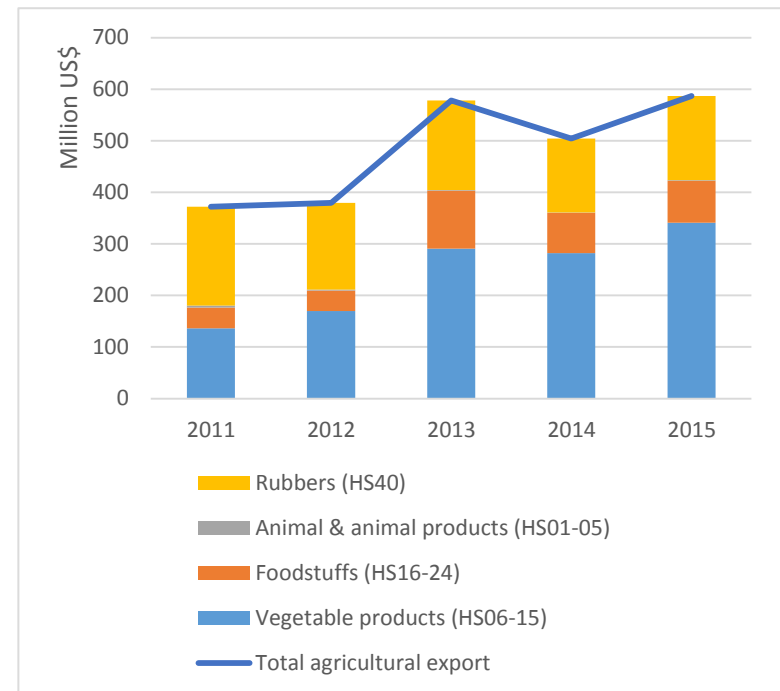
Source: FAOSTAT

Agricultural Export (1)

Agricultural and industrial share in total commodity export, 2011-2015



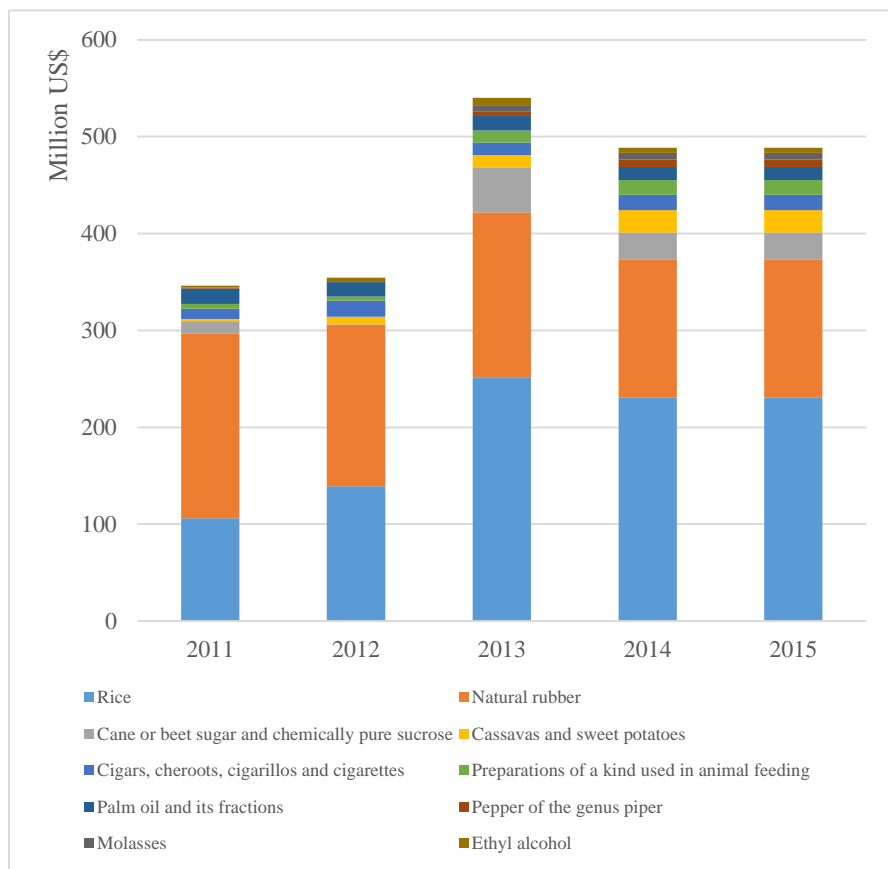
Agricultural and rubber export by chapter of HS2, 2011-2015



Source: Author's calculation based on UNCOMTRADE

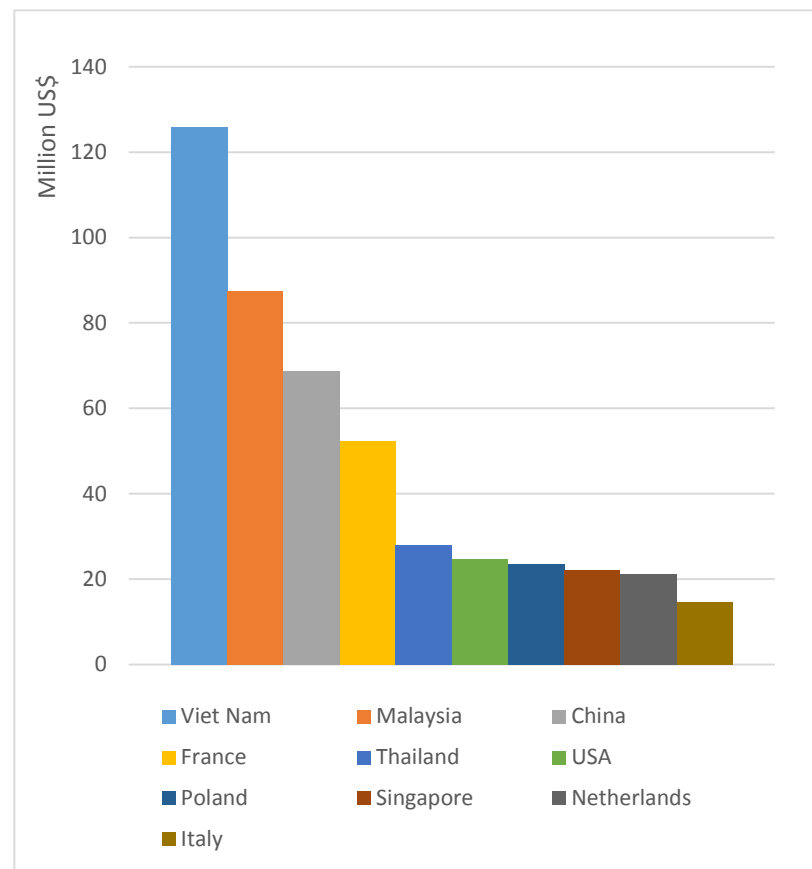
Agricultural Export (2)

Top ten exported agricultural products at HS4, 2011-2015



Author's calculation based on UNCOMTRADE

Top ten importers of Cambodia's agricultural products, 2015



Source: Author's calculation based on UNCOMTRADE

Analysis methods and Data (1)

- NTM coverage ratio: is frequency ratios of NTM imposed on a certain product categories. For this study we calculated NTM coverage ratios as the share of import value of agriculture products from Cambodia by its trade partners
- Regulatory distance: is a measure of the difference in NTM regimes between two countries. if two countries apply l type of NTM to six-digit HS commodity k , then regulatory difference in NTM l on commodity k of both country is $RD_{lk} = 0$; $RD_{lk} = 1$, otherwise It is calculated by the formula below:

$$D_{ij} = \frac{\text{sum of } RD_{lk}}{\text{count of } RD_{lk}}$$

Data

Mainly, this research utilized cross section data in 2015. The data was collected from the sources below.

- Trade data: was collected from UN COMTRADE: <https://comtrade.un.org/>.
- NTM data: was collected from WITS: <http://wits.worldbank.org/>
- GDP data: was collected from World Development Indicator (WDI): <http://data.worldbank.org/data-catalog/world-development-indicators>
- Other gravity model data: was collected from CEPII: http://www.cepii.fr/CEPII/en/bdd_modele/presentation.asp?id=8

Analysis methods and Data (2)

Gravity model

- $\ln X_{ij} = \beta_1 \ln GDP_j + \beta_2 \ln dist_{ij} + \beta_3 contig_{ij} + \beta_4 \ln(1 + SPSCount_{ij}) + \beta_5 \ln(1 + TBTcount_{ij}) + \beta_6 \ln(1 + NTBcount_{ij}) + \varepsilon_{ij}$

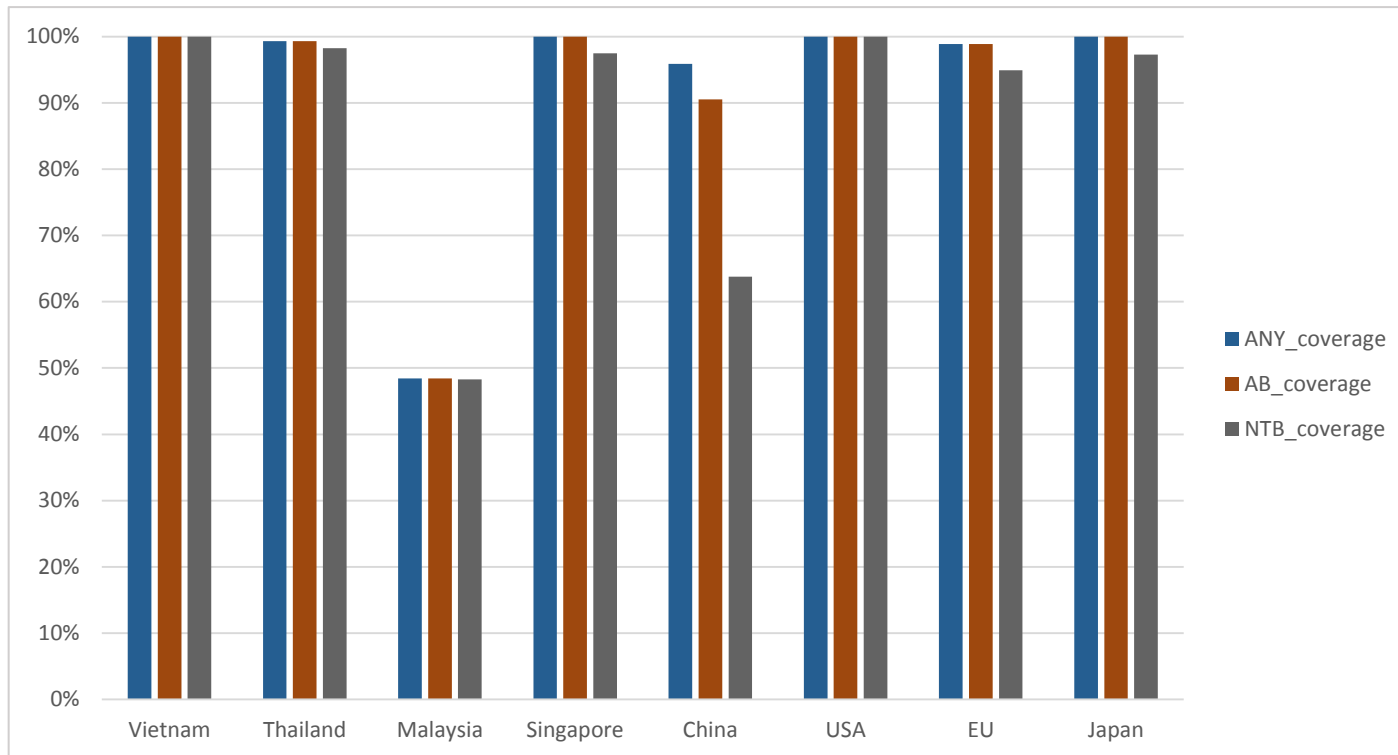
Where:

- X_{ij} is the aggregate agricultural export value of Cambodia to country j in 2015 (HS01-24+HS40).
- GDP_j is the country j 's GDP in 2015.
- $dist_{ij}$ denotes the distances between Cambodia and country j .
- $contig_{ij}$ is a dummy denoting common border between Cambodia and country j .
- ams is a dummy denoting partner being an ASEAN member state.
- $SPSCount_{ij}$ designates the total number of SPS measures imposed by country j on agricultural products.
- $TBTcount_{ij}$ designates the total number of TBT measures imposed by country j on agricultural products.
- $NTBcount_{ij}$ designates the total number of NTB measures imposed by country j on agricultural products.

Result of Analysis

Non-Tariff Measures on Cambodia Agricultural Export

NTM coverage ratio of Cambodia's agricultural export, 2015



Source: Author's calculation based on the World Integrated Trade Solution (WITS), World Bank

Note: AB = SPS and TBT; NTB: non-technical barriers

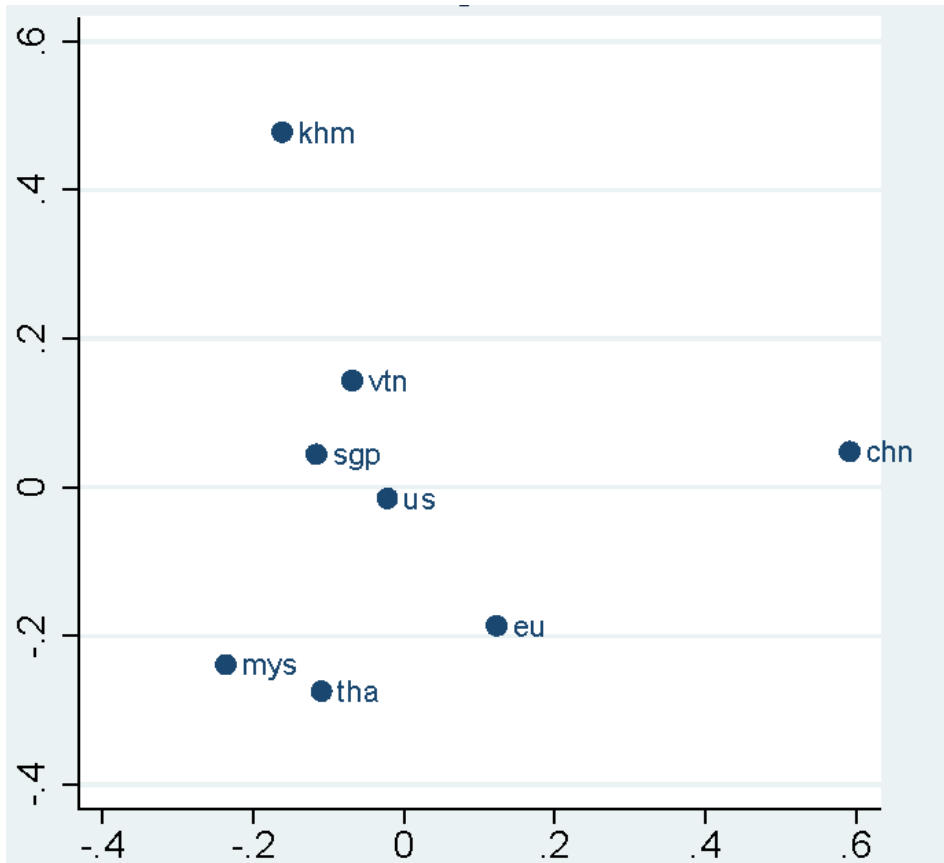
Prevalent NTMs on agricultural export

Countries	SPS	TBT	NTB	Total
EU	486	122	30	638
Vietnam	327	95	57	479
US	244	173	56	473
Thailand	255	65	72	392
China	141	87	52	280
Malaysia	154	82	28	264
Singapore	118	76	36	230

- SPS measures are the most prevalent NTMs imposed by major importing countries of Cambodia's agriculture products.
- EU has the largest number of NTMs, following by Vietnam and US.

Regulatory distances of NTM regimes

NTM regulatory distance



Source: Author's calculation based on The World Integrated Trade Solution (WITS)

Note: Classical MDS, Mardia fit measure 1 = 0.4003, Mardia fit measure 2 = 0.5175

The effects of NTMs

Results of gravity model

Intexport	Coef.	Robust Std. Err.	z	P>z	[95% Conf. Interval]	
lngdp_partner	0.097	0.03	3.32	0.001	0.04	0.15
lndist	-0.118	0.12	-1.03	0.305	-0.34	0.11
contig	0.316	0.23	1.35	0.176	-0.14	0.77
lncountSPS	0.443	0.41	1.08	0.282	-0.36	1.25
lncountTBT	0.067	0.26	0.26	0.796	-0.44	0.57
lncountNTB	-0.276	0.12	-2.37	0.018	-0.50	-0.05
ams	-0.014	0.26	-0.05	0.958	-0.53	0.50
_cons	-0.002	1.21	0.00	0.999	-2.37	2.37

Source: Author's calculation

Note: Number of observations (partners): 55; R-squared: 0.50, Estimator: ppml command in STATA

Conclusion

- Based on the overview of the agriculture sector and the results of analysis, the following conclusions can be drawn:
- Export of Cambodia's agricultural products has high NTMs coverage ratio. SPS and TBT has higher coverage ratios than NTB.
- SPS measures are the most prevalent NTMs imposed by major importing countries of agriculture products.
- Cambodia has a NTM regime that is different from all her major export partners. However, it is relatively similar to that of Vietnam and Singapore comparing to other partners.
- SPS and TBT were not likely the barriers for Cambodia agricultural exports. Cambodia's main agricultural products could meet the requirements of SPS and TBT measures applied by the partners such as EU, US, China, Malaysia, Thailand, Singapore, and Viet Nam.
- It did not indicate that Cambodia's exporters of agricultural products could comply with SPS and TBT with ease, because the gravity model could not detect that issue. Based on previous studies (ITC 2014), Cambodia exporters face burdensome procedure obstacles in applying for certificates or testing.
- Nonetheless Non-technical barriers (NTBs) are likely to hold back Cambodia agricultural export. A 10-percent increase in NTBs may reduce 2.7 percent of Cambodia agricultural export.

Recommendations

- Cambodia's regulatory conformity agency should make effort to reduce the procedure obstacles of testing and certification. Cambodia should have testing laboratories with international standards.
- Agrarian extension programmes should include raising awareness of farmers about the use of chemicals that are prohibited by importing countries.
- Cambodia should speed up regulatory convergence and harmonization, especially in the agricultural sector, which is initiated by ASEAN to address NTMs.
- Non-Tariff Barriers should be reduced; identification and elimination of Non-Tariff Barriers is adopted by the 20th AFTA council for integrating the priority sectors.

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