

Import Impact of China's Non-tariff Measures

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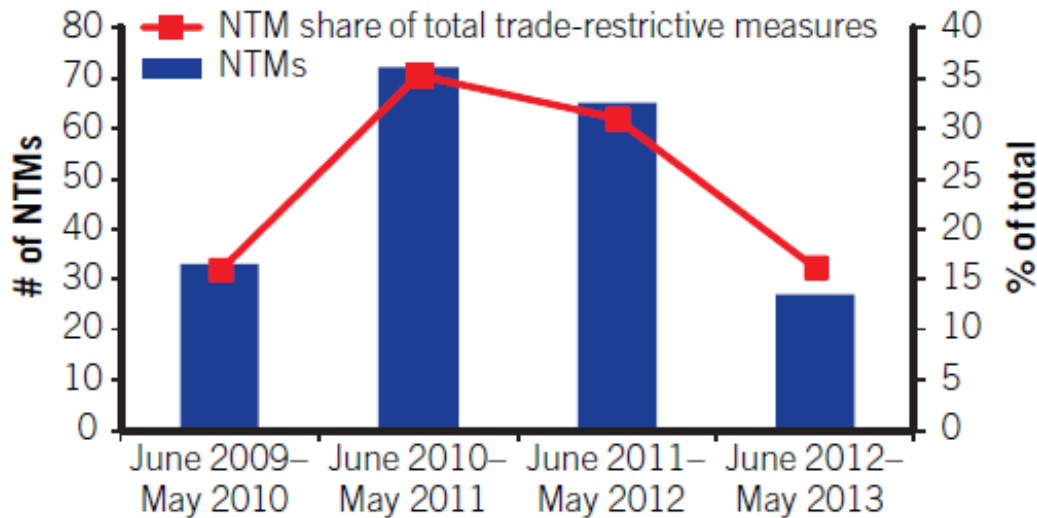
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Background

- Tariff reduction: GATT/WTO liberalization, China's WTO accession, DFQF for African countries, regional FTA...
- One of the reasons of recent trade slowdown:



- The main forms and focus of TPP/TTIP/TISA.

Motivation

- Under GVC, trade cost multiplies as a result of NTMs
- AVE estimations: NTMs more trade distorting than tariffs
- Changing objectives: from legitimate to protectionist
- Changing formality: from simple to diverse and complex
- Lack of empirical evidence
- More binding for LDCs exports: capacity building needed

- Definition

- The policy measures which could have impact on trade volume, price or both at the same time except for ordinary tariff measures (UNCTAD, 2009)

•United Nations Conference on Trade and Development (2012) :

Import_ related	Technical measures	A Sanitary and phytosanitary measures
		B Technical barriers to trade
		C Pre-shipment inspection and other formalities
	Non-technical measures	D Contingent trade-protective measures
		E Non-automatic licensing, quotas, prohibitions and quantity control measures other than for SPS or TBT reasons
		F Price-control measures, including additional taxes & charges
		G Finance measures
		H Measures affecting competition
		I Trade-related investment measures
		J Distribution restrictions
		K Restrictions on post-sales services
		L Subsidies (excluding export subsidies under P7)
		M Government procurement restrictions
		N Intellectual property
		O Rules of origin
Export_ related	P Export-related measures	

Source: UNCTAD, 2012, http://unctad.org/en/PublicationsLibrary/ditctab20122_en.pdf

Quantification: NTM restrictiveness

- 1. the frequency ratio (FR) & the coverage ratio(CR) used by *Beghin & Bureau(2001), Bora et al.(2002), Nicita(2009), Bao & Larry Qiu(2010)*

$$FI_j = \sum_i D_i M_i / \sum_i M_i \quad (1)$$

$$CR_j = \sum_i D_i V_i / \sum_i V_i \quad (2)$$

○The FI_j shows the **percentage** of import **products lines** by China in **product category j** affected by China's NTMs.

○The CR_j captures the extent of trade covered by NTMs: the **percentage of import values** by China in **product category j** that is affected by China's NTMs.

where i is a product item contained in product category j .

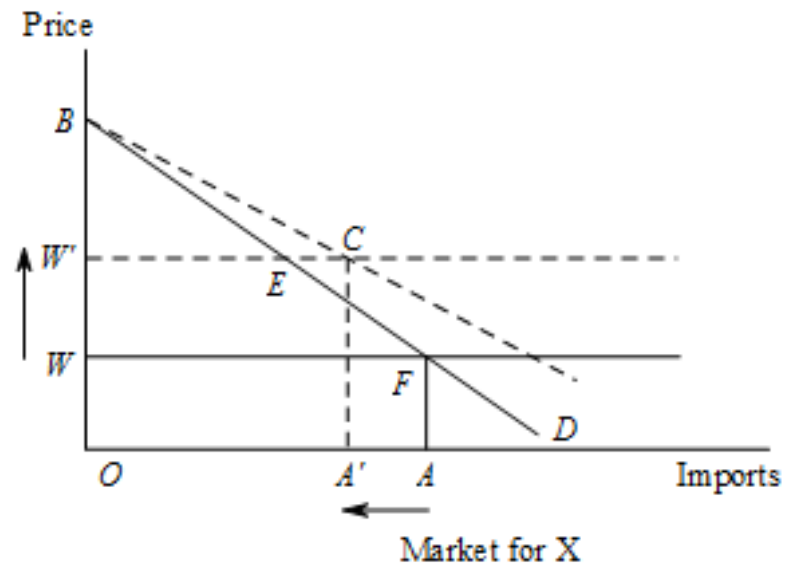
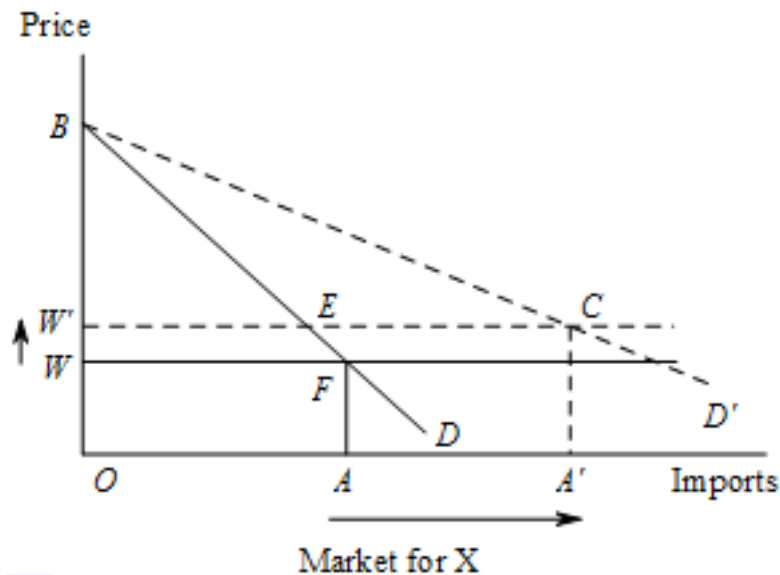
Quantification: NTM restrictiveness

- 2. Price gap approach: the first ad valorem equivalence estimations (AVEs) method. *Bradford(2003); Ferrantino(2006); Cadot et al. (2014)*
- 3. Econometric method: the gravity model as the second AVEs method. *Helpman, Melitz & Rubinstein (2004); Kee, Nicita & Olarreaga (2004,2008); Kee, et al.(2009)*

$$\ln(\text{importValue}) = \alpha + \beta \ln(1 + \text{tariff}) + \delta \text{NTMs} + \phi X$$

Possible trade impacts: could be either way

- Price effect: domestic price 8.7% higher on average globally, Kelleher & Reyes (forthcoming), but could be negative in theory, e.g., standardization
- Quantity effect: depends on relative changes in demand and supply



Our contributions

- To establish the first comprehensive China's NTMs' database.
 - All China's government official documents, downloading, reading, coding, data entry and editing.

The main database on NTMs

Name/Organization	Data collection method	Country included	Time range	Characteristics	Representative literature applied
UNCTAD TRAINS	Official data+ Firm survey	166 countries	1994-	The earliest and oldest; Out of date, incomplete	Bora, Kuwahara & Laird (2002); Fontagné et al. (2005); Disdier et al. (2008a); Essaji (2008)
The World Bank database	Firm survey	619 exporting firms in 17 developing countries	2001-2002	Old; only mandatory regulations suffered in EU, U.S., Japan, Canada and Australia	Maskus et al. (2005); Chen et al. (2006)
ITC NTM Surveys	Firm survey	23 completed; 9 ongoing/planned		China is not included	ITC (2015); 23 country-specific report (ITC, 2010-2013)
GTA database			2009-06-	Acted as "Early Warning"	Henn & McDonald (2011)
China's TBT database	Official Chinese NTM data	China	1998-2006	detailed HS8 level, but it has only 21 measures; 96 agricultural & manufacturing	Bao & Qiu (2010 and 2012); Bao & Chen (2013); Imbruno (2016)

This research....

- The first panoramic description on China's NTMs: Merging the import data at the HS8-digit from China's Customs with the NTM database, by ordinary & processing trade regime, exporting country codes, product and NTM codes (3-digit);

Test:

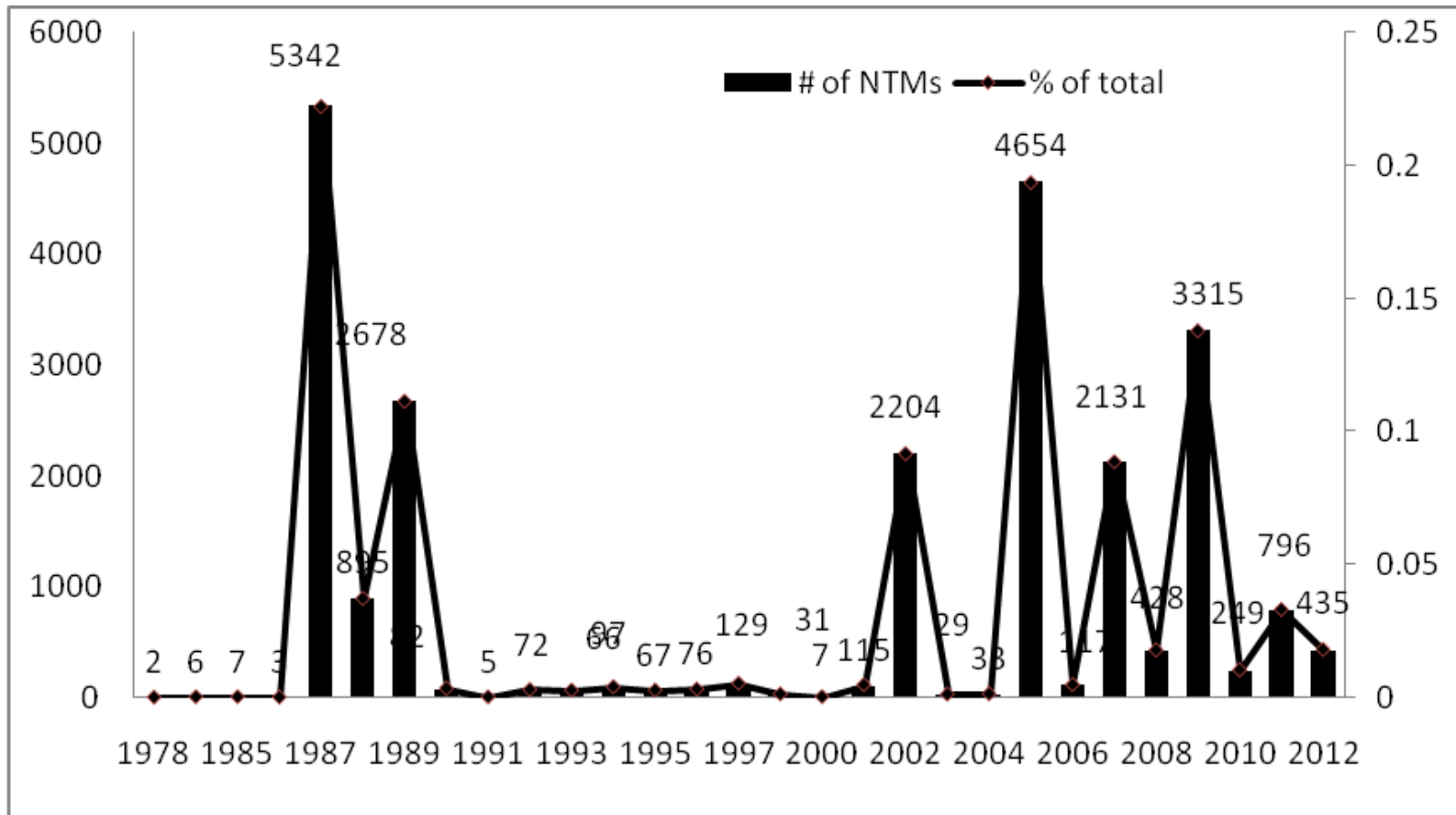
Hypothesis 1: a new measure can depress but also enhance trade;

Hypothesis 2: exporters can learn to adapt to a new measure;

Hypothesis 3: poor countries have more incentives to be adaptive to a new measure.

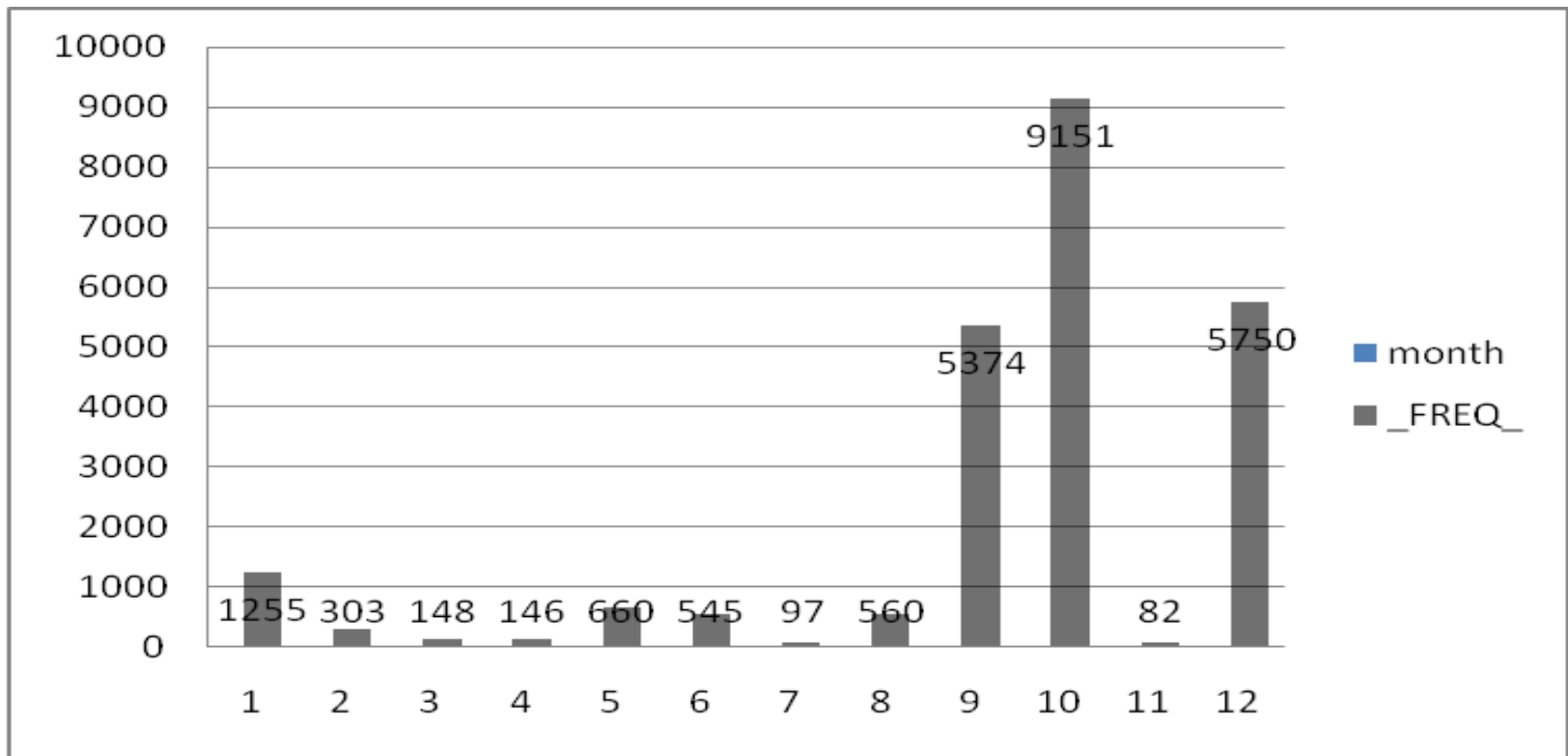
China NTM patterns

- Implementation over years



China NTM patterns

- Implementation over months



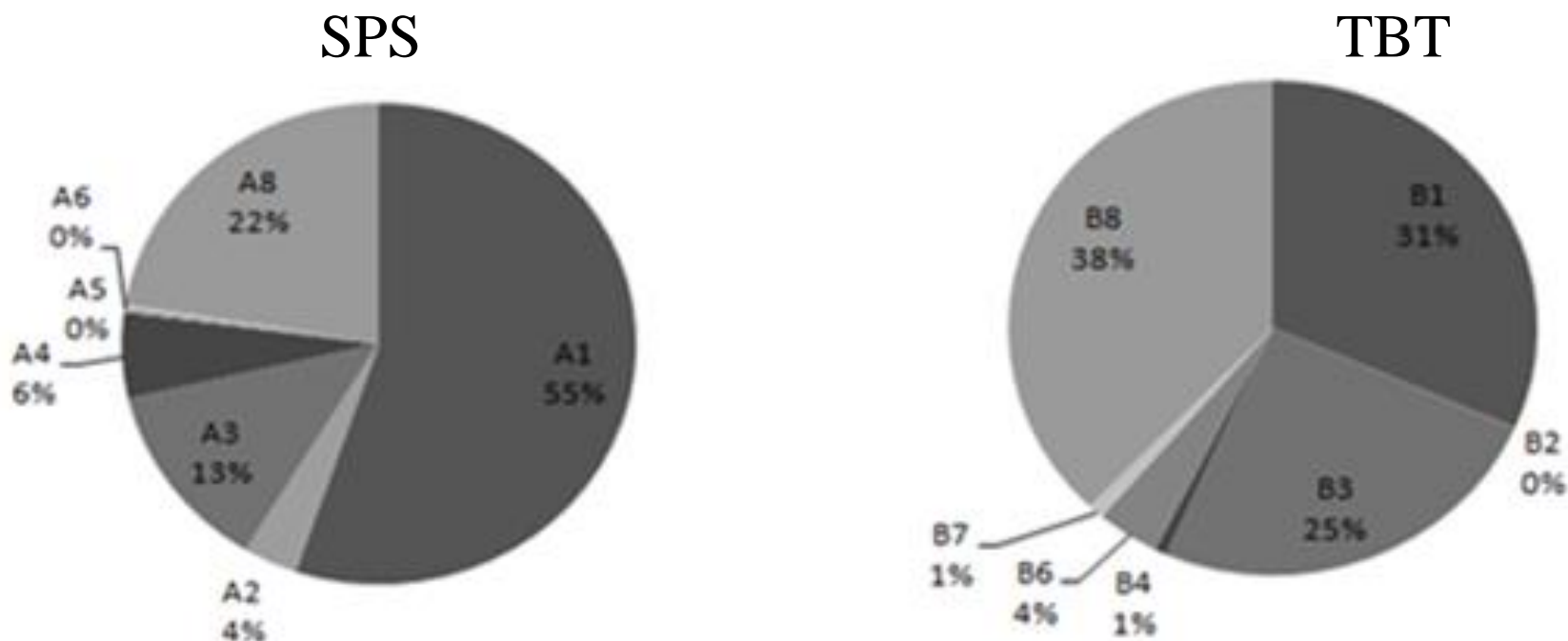
China NTM patterns

- Distribution over categories

Category	# of NTMs	% of NTMs
<i>A. Sanitary and phytosanitary measures</i>	926	3.85
<i>B. Technical barriers to trade</i>	20926	86.94
C. Pre-shipment inspection and other formalities	27	0.11
D. Contingent trade-protective measures	113	0.47
<i>E. Non-automatic licensing, quotas, prohibitions and quantity control measures other than for SPS or TBT reasons</i>	1607	6.68
H. Measures affecting competition	96	0.4
P. Export-related measures	214	0.89
Others	160	0.66

China NTM patterns

- Further breakdown of SPS and TBT measures



A1/B1 : Prohibitions/restrictions of imports for SPS/TBT reasons;

A3/B3 : Labelling, marking and packaging requirements;

A8/B8 : Conformity assessment related to SPS/TBT as requirement for product registration, testing, certification, inspection, traceability, quarantine, etc.

China NTM patterns

- Distribution over source countries

		# of NTMs	% of NTMs	ordinary (US \$ billion)	processing (US \$ billion)	Coverage ratio(simple average)	Coverage ratio(weighted average)
Common for world	All countries	23362	97.06%				
Only for developed regions	High income:OECD	271	1.13%	31.45	17.65	0.59	0.62
	High income:non OECD	42	0.17%	13.03	5.32	0.71	0.73
	total	313	1.3%	44.48	22.97		
Only for developing regions	East Asia & Pacific	57	0.24%	19.79	10.95	0.61	0.79
	Europe & Central Asia	72	0.30%	2.89	2.31	0.65	0.66
	Latin America & Caribbean	43	0.18%	4.56	2.78	0.69	0.61
	Middle East & North Africa	25	0.10%	8.11	4.74	0.70	0.75
	South Asia	15	0.06%	2.70	1.67	0.54	0.56
	Sub-Saharan Africa	23	0.10%	3.73	0.79	0.62	0.74
	total	235	0.98%	41.78	23.24		
unidentified		160	0.66%				

Baseline estimation: overall NTM effects

$$(1) \ln V_i = \alpha + \beta_1 NTM_i + \beta_2 \ln(1 + tariff_i) + \varepsilon_i$$

$$(2) \ln V_i = \alpha + \beta_1 NTM_i + \beta_2 \ln(1 + tariff_i) + \gamma_1 DAgriculture_i + \varepsilon_i$$

$$(3) \ln V_i = \alpha + \beta_1 NTM_i + \beta_2 \ln(1 + tariff_i) + \tau_1 NTM_i * \gamma_1 DAagri_i + \varepsilon_i$$

V_i : the ordinary, processing and total import value of product i at HS 8-digit;

NTM_i : 1. Dummy_NTMs, if product i suffers any NTMs, 1; otherwise, 0;

2. the log value of # of NTMs product i suffers;

3. the coverage ratio at HS8.

$tariff_i$: tariff data from the WITS for product I; 0 for processing trade;

$DAgriculture_i$: Dummy variable for product i, 1 for agricultural product (HS01-24) ; otherwise, 0.

$NTM_i * DAagri_i$: the interaction of NTMs and agriculture dummy.

Result 1: dummy var, positive correlation b/w NTM & imp —> NTM endogeneity issue

	Dependent Variables								
	ln(1+ordinary import)			ln(1+processing import)			ln(1+gross import)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dummy _NTM	6.85*** (0.00)	6.16*** (0.00)	7.37*** (0.00)	1.41*** (0.00)	1.42*** (0.00)	1.45*** (0.00)	1.78*** (0.00)	1.76*** (0.00)	1.77*** (0.00)
ln(1+tari ff)	-0.86*** (0.000)	-0.77*** (0.00)	-0.77*** (0.00)				-0.5*** (0.0)	-0.38*** (0.00)	-0.38*** (0.00)
Dummy _Agri		-2.04*** (0.00)	0.74 (0.26)		-2.12*** (0.00)	-1.86*** (0.00)		-2.41*** (0.00)	-2.37*** (0.00)
Dagri* DNTM			-2.79*** (0.00)			-2.65 (0.3)			-0.04 (0.86)
Constant	11.39*** (0.000)	12.13*** (0.00)	10.92*** (0.00)	14.77*** (0.00)	14.97*** (0.00)	14.94*** (0.00)	15.73*** (0.00)	15.98*** (0.00)	15.98*** (0.00)
Obs.	78970	78970	78970	76555	76555	76555	168512	168512	168512
R ²	0.1	0.14	0.14	0.0064	0.05	0.05	0.04	0.12	0.12

Result 1: freq, positive correlation b/w NTM & imp —> NTM endogeneity issue

	Dependent Variables								
	ln(1+ordinary import)			ln(1+processing import)			ln(1+gross import)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
ln(1+#of NTMs)	0.85*** (0.05)	0.93*** (0.05)	0.99*** (0.06)	1.19*** (0.06)	1.26*** (0.06)	1.28*** (0.06)	0.59*** (0.04)	0.79*** (0.04)	0.81*** (0.04)
ln(1+tariff)	-0.88*** (0.06)	-0.71*** (0.06)	-0.7*** (0.06)				-0.92*** (0.05)	-0.69*** (0.06)	-0.69*** (0.05)
Dummy_Agri		-1.71*** (0.14)	-0.69*** (0.41)		-1.92*** (0.14)	-1.46*** (0.47)		-2.14*** (0.14)	-0.87 (0.69)
DAgri*ln(1+#NTMs)			-0.53*** (0.2)			-0.23 (0.22)			-0.44** (0.23)
Constant	15.69*** (0.17)	15.42*** (0.17)	15.3*** (0.18)	12.62*** (0.12)	12.75*** (0.12)	12.72*** (0.12)	16.28*** (0.17)	15.65*** (0.17)	15.58*** (0.17)
Obs.	4845	4845	4845	4872	4872	4872	5116	5116	5116
R ²	0.12	0.153	0.155	0.09	0.134	0.134	0.1	0.15	0.15

Result 1: coverage, positive correlation b/w NTM & imp —> NTM endogeneity issue becomes weaker!

	Dependent Variables								
	ln(1+ordinary import)			ln(1+processing import)			ln(1+gross import)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Coverage ratio	0.087 (0.19)	0.21 (0.18)	0.76*** (0.2)	-0.0002 *** (0.06)	-0.0002* ** (0.00)	-0.0002 *** (0.00)	-1.11*** (0.21)	-1.05*** (0.21)	-0.42** (0.23)
ln(1+tariff)	-0.99*** (0.06)	-0.86*** (0.06)	-0.87*** (0.06)				-1.0*** (0.05)	-0.86*** (0.06)	-0.88*** (0.05)
Dummy_Agri		-1.4*** (0.14)	1.03*** (0.44)		-1.59*** (0.14)	-0.74** (0.36)		-1.4*** (0.14)	0.76* (0.45)
DAgri*Coverage_ratio			-2.77*** (0.49)			-0.9** (0.38)			-2.37*** (0.5)
Constant	17.4*** (0.2)	17.22*** (0.19)	16.78*** (0.2)	14.88** * (0.12)	15.1*** (0.05)	15.1*** (0.05)	18.85*** (0.22)	18.73*** (0.21)	18.2*** (0.22)
Obs.	4826	4826	4826	4760	4760	4760	5012	5012	5012
R ²	0.071	0.09	0.10	0.005	0.03	0.036	0.078	0.1	0.11

Result 2: adapt to comply, fix endogeneity issue

$$\ln(V_{ij}) = \alpha_0 + \beta_1 \ln(1 + \text{year})_{ij}^k + \beta_2 \ln(1 + \text{tariff}_{ij}) + \alpha_1 \ln \text{GDP}_j + \alpha_2 \ln \text{PGDP}_j + \alpha_3 \ln \text{Dist}_j + \alpha_4 \text{Contig}_j + \alpha_5 \text{Comlang}_j + \varepsilon_{ij}$$

basic standard gravity model: including NTM duration etc

V_{ij} : the ordinary, processing and total imports of product i at HS 8-digit;

$\ln(1 + \text{year})_{ij}^k$: the duration of measures k the importing product i from country j suffers ;

tariff_{ij} : tariff data from the WITS for the import of product i from country j ;
0 for processing trade;

$\ln \text{GDP}_j$, $\ln \text{PGDP}_j$, $\ln \text{Dist}_j$, Contig_j & Comlang_j : Gravity controls.

Result 2: adapt to comply, fix endogeneity issue

	Dependent Variables: In (1+gross import)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
In (1+year)	-0.59*** (0.01)	-0.58*** (0.01)	-0.68*** (0.01)	-0.59*** (0.01)	-0.52*** (0.02)	-0.58*** (0.01)	-0.61*** (0.02)	-0.63*** (0.02)
In (1+tariff)	-0.1*** (0.01)	-0.09*** (0.01)	-0.08*** (0.01)	-0.1*** (0.01)	-0.1*** (0.01)	-0.09*** (0.01)	-0.09*** (0.01)	-0.09*** (0.01)
Dummy_Agriculture		-0.32*** (0.03)	-2.57*** (0.01)			-0.33*** (0.03)	-2.6*** (0.1)	-2.53*** (0.1)
Dagri*In(1+year)			0.94*** (0.04)				0.93*** (0.04)	1.11*** (0.04)
Dummy_rich				0.48*** (0.03)	0.9*** (0.06)	0.49*** (0.03)	0.9*** (0.06)	0.86*** (0.06)
Drich*In(1+year)					-0.2*** (0.02)		-0.18*** (0.02)	-0.11*** (0.02)
Dagri*Drich*In(1+year)								-0.52*** (0.02)
InGDP	-0.02*** (0.00)	-0.01*** (0.00)	-0.01*** (0.00)	-0.05*** (0.00)	-0.05*** (0.00)	-0.05*** (0.00)	-0.05*** (0.00)	-0.05*** (0.00)
InPGDP	0.12*** (0.01)	0.11*** (0.01)	0.11*** (0.01)	0.09*** (0.01)	0.09*** (0.01)	0.08*** (0.01)	0.08*** (0.01)	0.07*** (0.01)
InDist	-0.6*** (0.02)	-0.61*** (0.02)	-0.61*** (0.02)	-0.53*** (0.02)	-0.53*** (0.02)	-0.54*** (0.02)	-0.54*** (0.02)	-0.52*** (0.02)
Contig	-0.69*** (0.05)	-0.72*** (0.05)	-0.71*** (0.05)	-0.43*** (0.05)	-0.44*** (0.05)	-0.46*** (0.05)	-0.46*** (0.05)	-0.47*** (0.05)
Constant	17.03*** (0.2)	17.1*** (0.2)	17.32*** (0.2)	17.44*** (0.2)	17.25*** (0.2)	17.52*** (0.2)	17.54*** (0.2)	17.44*** (0.2)
Obs.	151256	151256	151256	150078	150078	150078	150078	150078
R ²	0.029	0.029	0.033	0.032	0.032	0.033	0.036	0.04

Result 2: adapt to comply, fix endogeneity issue

	Dependent Variables: In (1+ordinary import)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
In (1+year)	-0.55*** (0.02)	-0.54*** (0.02)	-0.63*** (0.02)	-0.54*** (0.02)	-0.46*** (0.02)	-0.54*** (0.02)	-0.54 (0.02)	-0.57*** (0.02)
In (1+tariff)	-0.28*** (0.01)	-0.26*** (0.01)	-0.25*** (0.01)	-0.3*** (0.01)	-0.3*** (0.01)	-0.28*** (0.01)	-0.27 (0.01)	-0.26*** (0.01)
Dummy_Agriculture		-0.4*** (0.04)	-2.37*** (0.14)			-0.4*** (0.04)	-2.35*** (0.14)	-2.32*** (0.14)
Dagri*In(1+year)			0.83*** (0.05)				0.82*** (0.05)	0.96*** (0.06)
Dummy_rich				0.52*** (0.04)	1.00*** (0.09)	0.52*** (0.04)	1.0*** (0.09)	0.97*** (0.09)
Drich*In(1+year)					-0.21*** (0.03)		-0.21*** (0.03)	-0.15*** (0.03)
Dagri*Drich*In(1+year)								-0.44*** (0.03)
InGDP	-0.03*** (0.01)	-0.03*** (0.01)	-0.03*** (0.01)	-0.07*** (0.01)	-0.07*** (0.01)	-0.07*** (0.01)	-0.06*** (0.01)	-0.06*** (0.01)
InPGDP	0.18*** (0.01)	0.17*** (0.01)	0.17*** (0.01)	0.15*** (0.01)	0.15*** (0.01)	0.14*** (0.01)	-0.29*** (0.01)	0.13*** (0.01)
InDist	-0.67*** (0.02)	-0.68*** (0.02)	-0.68*** (0.02)	-0.6*** (0.03)	-0.6*** (0.03)	-0.61*** (0.03)	-0.61*** (0.03)	-0.6*** (0.03)
Contig	-0.54*** (0.07)	-0.57*** (0.07)	-0.57*** (0.07)	-0.25*** (0.08)	-0.25*** (0.08)	-0.28*** (0.08)	-0.29*** (0.08)	-0.3*** (0.08)
Constant	17.71*** (0.27)	17.8*** (0.27)	18.02*** (0.27)	18.16*** (0.27)	17.94*** (0.27)	18.26*** (0.27)	18.24*** (0.27)	18.17*** (0.27)
Obs.	78282	78282	78282	77633	77633	77633	77633	77633
R ²	0.04	0.04	0.044	0.043	0.044	0.044	0.048	0.05

Result 2: adapt to comply, fix endogeneity issue

	Dependent Variables: In (1+processing import)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
In (1+year)	-0.59*** (0.02)	-0.59*** (0.02)	-0.69*** (0.02)	-0.6*** (0.02)	-0.53*** (0.00)	-0.59*** (0.02)	-0.62*** (0.02)	-0.65*** (0.02)
Dummy_Agriculture		-0.14*** (0.04)	-2.54*** (0.15)			-0.16*** (0.05)	-2.53*** (0.15)	-2.5*** (0.14)
Dagri*In(1+year)			1.01*** (0.06)				0.99*** (0.06)	1.2*** (0.06)
Dummy_rich				0.48*** (0.04)	0.85*** (0.09)	0.48*** (0.04)	0.84*** (0.09)	-0.81*** (0.09)
Drich*In(1+year)					-0.16*** (0.04)		-0.17*** (0.04)	-0.08*** (0.04)
Dagri*Drich*In(1+year)								-0.61*** (0.04)
InGDP	-0.00 (0.01)	0.00 (0.01)	0.00 (0.01)	-0.04*** (0.01)	-0.04*** (0.01)	-0.04*** (0.01)	-0.03*** (0.01)	-0.03*** (0.01)
InPGDP	0.06*** (0.01)	0.06*** (0.01)	0.06*** (0.01)	0.03*** (0.01)	0.03*** (0.01)	0.03*** (0.01)	0.03*** (0.01)	0.007 (0.01)
InDist	-0.49*** (0.03)	-0.49*** (0.03)	-0.5*** (0.03)	-0.42*** (0.03)	-0.42*** (0.03)	-0.42*** (0.03)	-0.42*** (0.03)	-0.4*** (0.03)
Contig	-0.8*** (0.08)	-0.81*** (0.08)	-0.79*** (0.08)	-0.55*** (0.08)	-0.56*** (0.08)	-0.56*** (0.08)	-0.56*** (0.08)	-0.58*** (0.08)
Constant	16.03*** (0.28)	16.07*** (0.28)	16.3*** (0.28)	16.4*** (0.28)	16.24*** (0.28)	16.45*** (0.28)	16.5*** (0.28)	16.39*** (0.28)
Obs.	72974	72974	72974	72445	72445	72445	72445	72445
R ²	0.024	0.024	0.028	0.026	0.026	0.026	0.03	0.034

Extension of this research...

•NTMs measurement:

Have done:

- 1. Dummy variable for product. 1 if suffering any NTMs, otherwise 0.
- 2. Frequency of NTMs a product suffers.
- 3. Coverage ratio for product.
- 4. The length of the time from the first the year a NTM implemented to 2012.

To be done:

Chinese NTM trade restrictiveness estimation following Kee et al (2009, 2016)

Concluding remarks

- Chinese NTMs have endogeneity problem. After its correction, NTMs depress overall imports.
- Exporters in low income countries have been able to adapt to new NTMs over time.
- Agric exporters are more adaptable over time to new NTMs.

comments welcome

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