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# Something Fishy: Tariff vs Non-Tariff Barriers in Seafood Trade

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# Motivation and Objective

- Much literature shows as trade barriers decrease, they may be replaced with less transparent or contingent alternatives
- Past literature shows food safety standards and import regulations can limit and divert trade

*Are non-tariff barriers used as substitutes for tariffs?*



Canadian non-tariff trade barrier

# Non-Tariff Barriers in Ag

Standards can act as trade barriers or catalysts

- Swann et al. (1996) and Moenius (2004): *catalysts*
- Otsuki et al. (2001) and Disdier and Marette (2010): *barriers*
- Anders and Caswell (2009): *both*

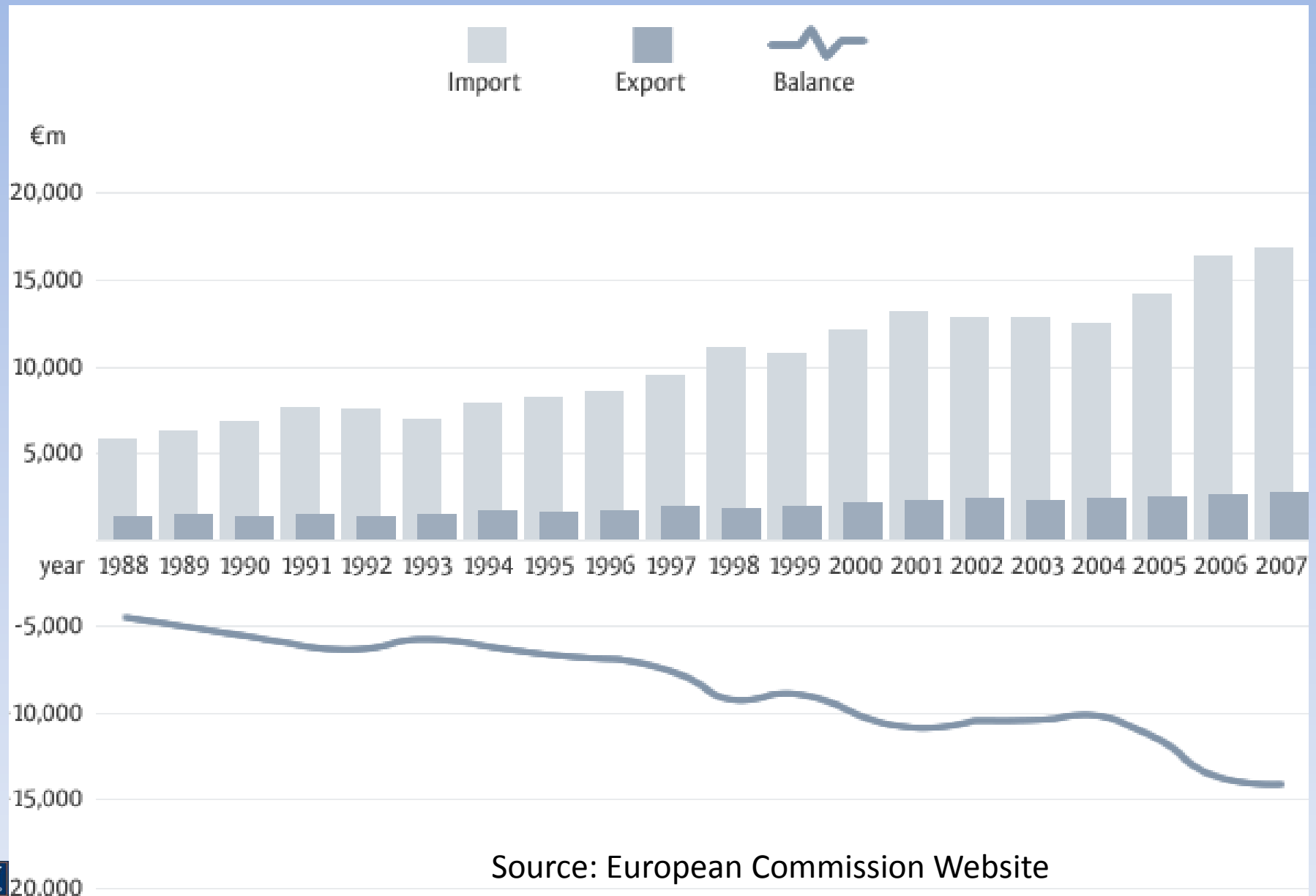
Import rejections deflect imports

- Grant and Anders (2011)
- Baylis, Nogueira and Pace (2011)

Few papers empirically estimate how non-tariff barriers respond to changes in tariffs (Bown and Tovar 2011 an exception – use exogenous shocks to tariffs)

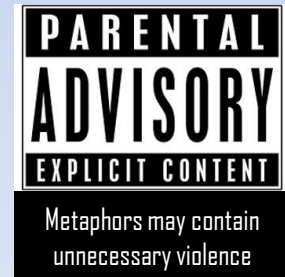
*To do this, we consider seafood imports, tariffs and the use of import notifications in the European Union*

# Why Seafood?



# Up next

4:30	spurious math slide
5:00	public service message (methods and data)
6:00	results
7:30	results in detail (health drama)
8:00	quibble and response
9:00	flog results
10:00	flog results some more
11:00	still more flogging
12:00	implications



# Model

Gov't objective:  $Max_{t,n} W = \omega_{\pi}\pi(t,n) + \omega_s s(t,n) - \omega_d d(t,n)$

where  $t$  are tariffs,  $n$  are non-tariff barriers,  $\pi$  is domestic profit,  $s$  is safety and  $d$  is the cost of distortion to consumers.

As  $\bar{t} < t^*$ , at old  $n^*$

$$\frac{\partial W}{\partial n} = \omega_{\pi} \frac{\partial \pi}{\partial n} + \omega_s \frac{\partial s}{\partial n} - \omega_d \frac{\partial d}{\partial n} > 0$$

Thus  $n^*$  increases as  $d\bar{t} < 0$ . In general:

$$n^* = f\left(d\bar{t}, \frac{\partial \pi}{\partial n}, \frac{\partial s}{\partial n}, \frac{\partial d}{\partial n}\right)$$

# Empirical Methods: Count Model

Count of Notifications: HS6(h) x importer(i) x exporter(j) x year(t)

$$P(\text{EU notification}) = \beta_0 + \beta_1 d\bar{t} + \beta_2 (\text{Risk}) + \beta_2 (\text{TradeProtection})$$

$$\text{Risk} = f(X_{jht}, Z_{jt}, D_{ij})$$

$$\text{Trade Protection} = f(X_{jht}, Z_{it})$$

X are product characteristics

Z are country characteristics

D is distance

t are tariff rates

Only consider imports into countries that are or become EU member states from non-EU states ( $N \cong 200,000$ )

# Data

- Annual: 1998 to 2008
- Non-tariff barriers: EU seafood import notifications, coded at 6-digit Harmonized System (HS) level (N=4,151) (*European Commission*)
- Global bilateral trade flows: 6-digit HS code (*United Nations COMTRADE database*)
- Ad valorem tariff rates (WTO)

## Data “issues”

- No quantity of ‘notified’ shipments
- Descriptions, not HS codes in refusal data

# Results

## Negative Binomial Regression on Count of EU Notifications with Applied Tariff Rates

	(1)	(2)	(3)	(4)
Variables	Simple Model	Risk Model	Political Economy	Full Model
$\Delta \hat{T}_{ijht}$	-0.261** (0.119)	-0.354*** (0.0948)	-0.189^ (0.117)	-0.231*** (0.0879)
Controls	No	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Importer FE	Yes	Yes	Yes	Yes
Export Region FE	Yes	Yes	Yes	Yes
Observations	207,367	186,700	165,185	148,938
Number of panel	30,118	27,375	23,444	21,331
IV relevance (tariff)	420***	414***	281***	273***
Overidentification (tariff)	1.144	1.652	1.774	2.655
IV relevance (quantity)	37000***	35000***	29000***	19000***
Overidentification (quantity)	1.048	1.122	0.707	0.781

Standard errors in parentheses: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

# Logit regression on Low versus High hazard notifications

	(1)	(2)	(3)	(4)
VARIABLES	Low and Medium Hazards	Low Hazards	Low and medium hazard given no entry	Low hazard given no entry
dT_hat	-0.379** (0.161)	-0.512*** (0.180)	-0.733*** (0.237)	-0.781*** (0.270)
Year FE	Yes	Yes	Yes	Yes
Importer FE	Yes	Yes	No	No
Export Region FE	Yes	Yes	Yes	Yes
Observations	3,894	3,875	1,984	1,984
IV relevance (tariff)	8.48**	8.48**	48.94***	48.94***
Overidentification (tariff)	0.24	0.08	0.78	0.93
IV relevance (quantity)	5124***	5124***	2368***	2368***
Overidentification (quantity)	0.00	0.21	0.1	0.22

Standard errors in parentheses

## For the skeptics ...

- Do our tariffs vary enough over time?

Yes: 85% tariff lines change at least once and most change 3 or more times.

- Are those changes real or just driven by changes in trade value?

Less than 1% of values appear to not be set as ad valorem rates.

- Are those changes likely to affect anything?

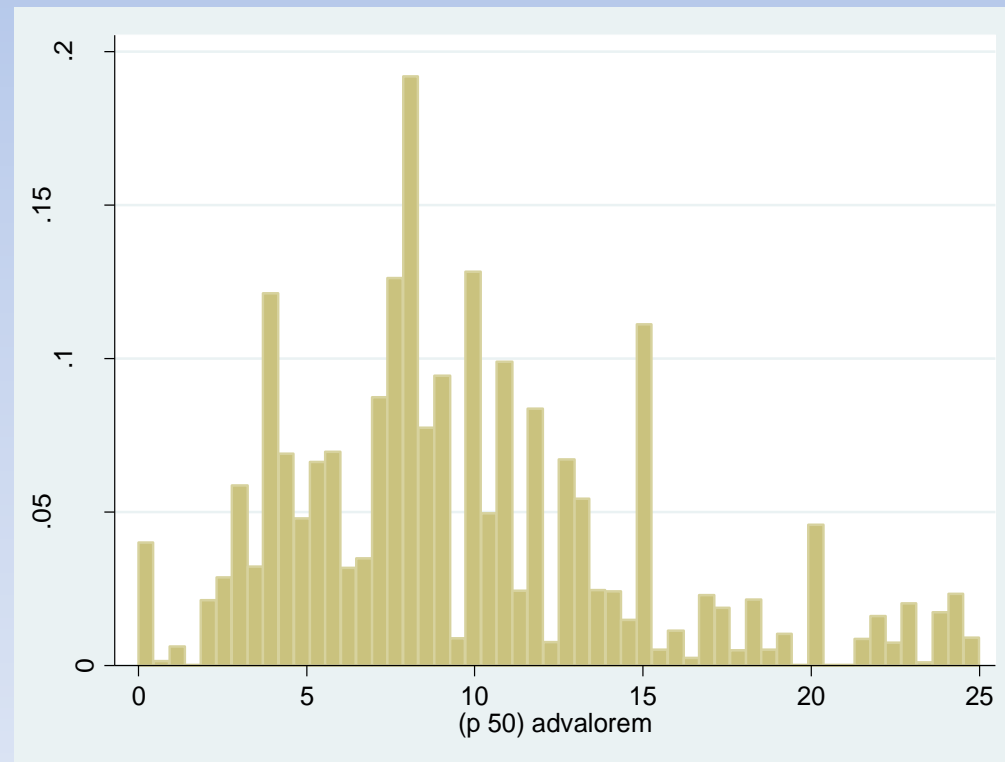
Most changes are ~ 3%: large.

- What if tariffs changed in response to demand for protection?

We only look at tariff changes induced by trade agreements.

- But if tariffs fall, wouldn't we expect to see an increase in imports, and an increase in refusals?

We include current import quantity instrumented by imports from neighbouring regions. Also consider refusals/imports.



# Robustness I: Notifications per import quantity

Variables	Notifications divided by imports
$\Delta \hat{T}_{ijht}$	-0.00650*** (0.0016)
HS4 FE	Yes
Year FE	Yes
Importer FE	Yes
Export Region FE	Yes
Observations	71,727
IV relevance (tariff)	10000***
Overidentification (tariff)	2.293

Standard errors in parentheses: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

# Robustness II: Tariffs

	(1)	(2)	(3)
Variables	Maximum Tariff Rate	Ad Valorem – no interpolated values	True Ad Valorem
$\Delta \hat{T}_{ijht}$	-0.110* (0.0658)	-0.215*** (0.0761)	-0.167** (0.0837)
Full Controls	Yes	Yes	Yes
Product FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Importer FE	Yes	Yes	Yes
Export Region FE	Yes	Yes	Yes
Observations	148,938	148,938	147,529
Number of panels	21,331	21,331	21,329
IV relevance (tariff)	39.84***	2139***	2140***
Overidentification (tariff)	3.362*	2.101	2.006
IV relevance (quantity)	21000***	19000***	19000***
Overidentification (quantity)	1.342	1.113	1.097

Standard errors in parentheses: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

# Robustness Tests III: Functional Form

Variables	(1) EU notification dummy (logit)	(2) EU notification, positive imports in current or past year (neg binomial)	(3) EU notification, linear form	(4) EU notification, log form
$\Delta \hat{T}_{ijht}$	-0.262** (0.104)	-0.166** (0.082)	-0.0572** (0.027)	-0.0220*** (0.007)
HS4 FE	yes	yes	yes	yes
Year FE	Yes	Yes	Yes	Yes
Importer FE	Yes	Yes	Yes	Yes
Export Region FE	Yes	Yes	Yes	Yes
Observations	148,938	64,289	148,938	148,938
Number of panel	21,331	13,883	21,331	21,331
IV relevance (tariff)	273***	157***	273***	274***
Overidentification (tariff)	1.984	3.275*	2.655	3.915**
IV relevance (quantity)	21000***	6553***	19000***	19000***
Overidentification (quantity)	0.431	2.967*	0.836	0.058

Standard errors in parentheses: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

# Other Robustness Tests

- Importer, exporter and year fixed effects
- Average versus maximum tariff rates
- Only original EU-15 members
- Dropping “other” HS categories

# Methods II: Modified Gravity Model

$$\begin{aligned} \ln \text{Value}_{ijht} = & \alpha_0 + \alpha_1 \text{totEUnotification}_{jht} + \alpha_2 dT \\ & + \alpha_3 \ln \text{Value}_{ijht-1} + \alpha_4 \ln \text{GDP}_{ijt} + \alpha_5 \text{ExRate}_{ijt} \\ & + \alpha_6 \text{ComLanguage}_{ij} + \alpha_7 \ln \text{Distance}_{ij} + \alpha_8 \text{Border}_{ij} + \varepsilon_{ijt} \end{aligned}$$

i=importer, j=exporter, h=product, t=year

- Estimation: Heckman model (significant IMR)
- Notification, change in tariff and lagged trade value may be **endogenous**:
  - Use number of notifications from other exporters in same geographic region of same product in same year
  - Use Arellano and Bond approach for a dynamic panel
- **Only consider exporters x product that have at least one notification during our period ( $N \cong 207,000$ )**

# Results: Gravity model

	(1)	(2)	(3)	(4)
Variable	Change in trade value	Change in trade value	Heckman	Heckman
Import notifications	-0.145*** (0.048)	-0.108** (0.046)	-0.622*** (0.069)	-0.576*** (0.067)
Change in instrumented tariff rate	-0.181*** (0.021)	-0.175*** (0.020)	-0.286*** (0.018)	-0.288*** (0.018)
Inverse Mills Ratio			6.373*** -0.103	6.494*** -0.101
Importer and Export Region FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
HS4-digit FE	Yes	No	Yes	No
Observations	32,379	32,632	44,830	44,830
Number of panel	6,964	7,001	11,385	11,385
IV relevance (notifications)	2112***	2246***	33.5***	4045***
Overidentification (notifications)	0.59	0.38	8.53*	4.4
IV relevance (tariff)	45.09***	56.82***	33.12***	33.01***
Overidentification (tariff)	2.31	0.76	2.33	2.23

Standard errors in parentheses: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

# Implications

- Evidence that notifications (particularly of low-hazard goods) in part driven by decreases in tariffs.
- Also evidence notifications driven by risk.
- The increase in refusals decrease trade gains from tariff reductions by 23.5%.

# Thank you

