

Trade effects of regulatory heterogeneity and international regulatory cooperation

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Introduction: NTMs and IRC mechanisms

- Recent years: Surge in non-tariff measures (NTMs)
- Even if they address market failures without trade objectives, NTMs may affect flows between countries
 - International regulatory cooperation (IRC) mechanisms are crucial
- 3 main IRC mechanisms, depending on their level of implementation: national, supra-national or multilateral level
 - ✓ National: Unilateral good regulatory practices (GRPs)
 - ✓ Supranational: Regulatory convergence between some countries (mutual recognition or harmonisation of NTMs, often within a trade agreement)
 - ✓ Multilateral: Rules set by international organisations and standard-setting bodies

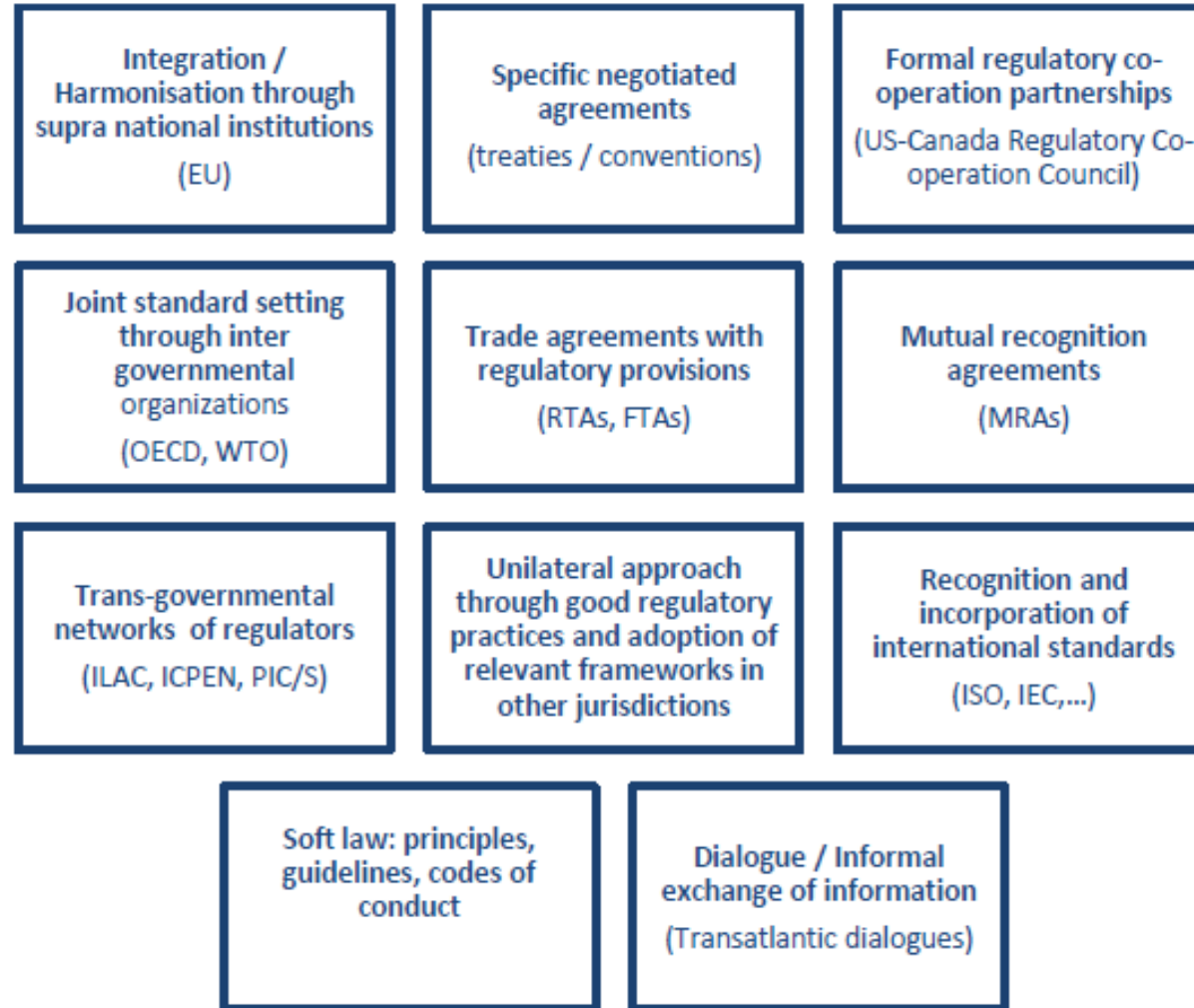
Introduction: Quantification of trade effects

- Quantification of trade effects of IRC mechanisms
 - ✓ Ex-ante and ex-post assessments
 - ✓ Descriptive statistics, econometric studies, simulation analysis, cost-benefit analysis
 - ✓ Macro (country), sector, firm-level
- Direct vs. indirect quantification
 - ✓ Direct: Estimation or simulation of a gravity-like trade equation
 - ✓ Indirect: Quantification of price effects of NTMs and IRC mechanisms, which in turn affect trade flows
- Trade vs. welfare effect

Related literature

- Inventory of IRC mechanisms (OECD, 2013 & 2016a): 11 IRC mechanisms classified from the most to the least formal and legally binding (see Figure)
- Trade costs related to regulatory divergence (OECD, 2016a)
- Role of 50 international organisations involved in standard-setting and rule-making activities (OECD 2016b) Specific reviews in 2016 (OECD/FAO; OECD/ISO; OECD/WHO; etc.)

IRC typology



Source: OECD (2013)

Road map

1. Good regulatory practices (GRPs) at the national level

1-1. Definition and mechanisms

1-2. Ex ante and ex post assessments of GRP impact

1-3. Border inspections

2. International regulatory convergence

2-1. Heterogeneity in regulations across countries: regulatory distance and trade impact

2-2. Regulatory convergence in trade agreements: mechanisms and trade impact

2-3. Harmonization to international standards: mechanisms and trade impact

3. Multilateral disciplines

3-1. WTO SPS and TBT committees

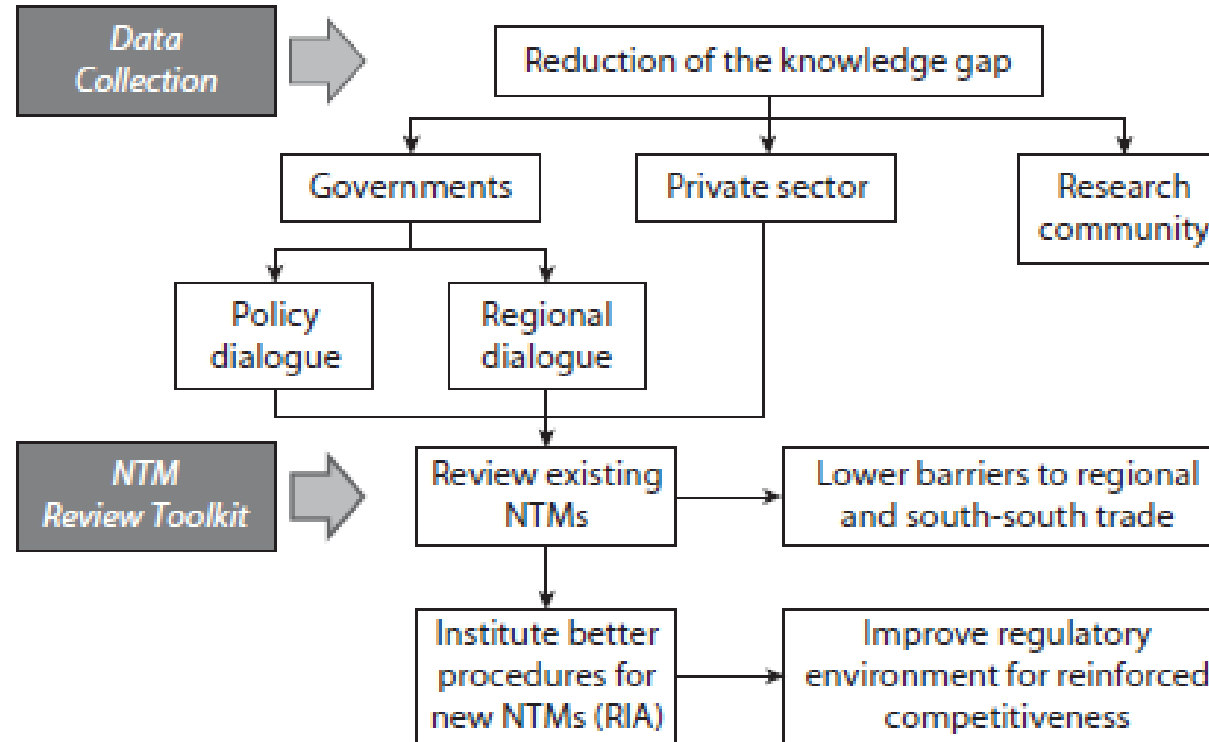
3-2. Aid for Trade Programmes

1. Good regulatory practices (GRPs) at the national level

1-1. Definition and mechanisms

- Many NTMs protect consumer health and environment
→ Issue: Not the removal of all NTMs but the improvement in their design and enforcement
- Trade effects of GRPs work through 3 channels (Basedow and Kauffmann, 2016)
 - ✓ Increase regulatory coherence domestically and internationally
 - ✓ Encourage transparency and trust of trading partners in the regulatory framework
 - ✓ GRPs less costly and more sustainable than non-GRPs → impede less/promote trade
- Assessment of NTM trade effects within GRPs
 - ✓ Time-frame: Ex-ante vs. ex-post assessment (see Figure)
 - ✓ Ex-ante: Regulatory impact Assessments (RIAs) based on simulations
 - ✓ Ex-post: Econometrics-based comparisons of outcomes (with and without the NTM)
Example: World Bank's NTM streamlining toolkit (Cadot et al., 2012)

Ex-ante vs. ex-post assessment of GRPs



Note: NTM = non-tariff measure, RIA = regulatory impact assessment.

1-2. Ex ante and ex-post assessments of GRP impact

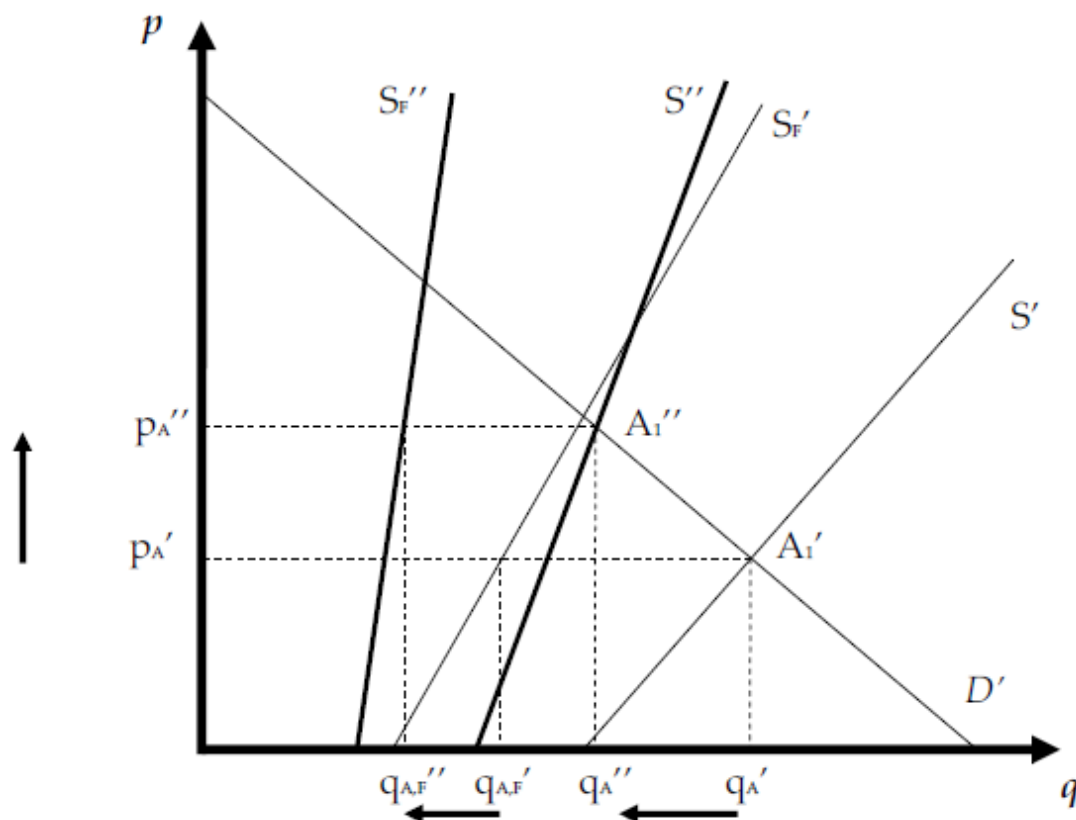
1-2-1. Ex-ante RIAs

Analytical framework (Van Tongeren et al., 2009):

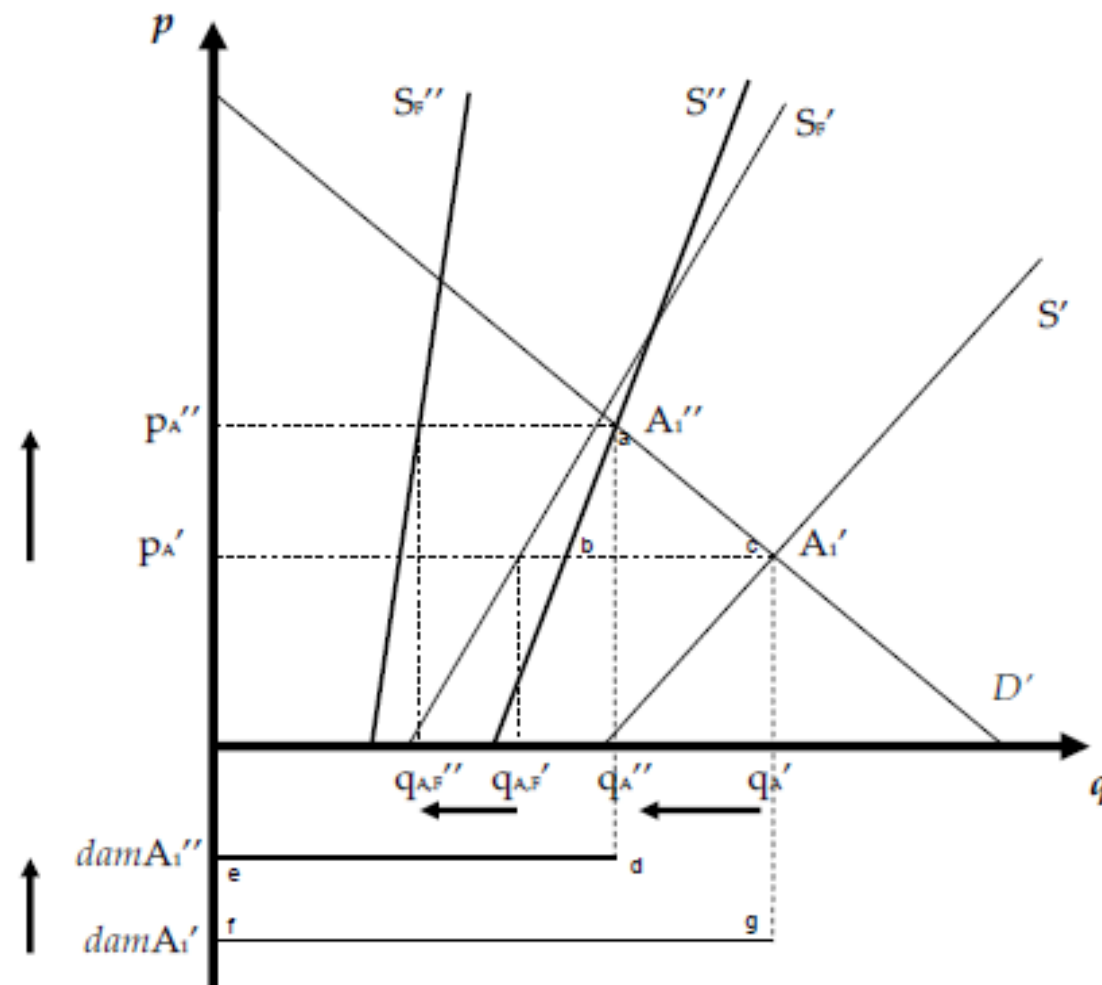
- Trade and non-trade related costs and benefits of NTMs for all stakeholders along the supply chain (e.g. domestic consumers, producers and governments, foreign suppliers)
- Modular partial equilibrium model (see Figure)
- Distinction between concerned agents vs. non concerned ones
- Demand and supply calibrated to empirical data. Computation of welfare effects
- Comparison between different regulations (e.g. ban, standard, tax, etc.)

Trade & welfare effects of NTMs: graphical evidence

Application of a public standard



Application of a public standard and welfare



Example: effects of a label on fish

Fish consumption in France. Van Tongeren et al. (2009)

- Health: desirable shift of consumption from tuna to sardines
 - 95% (99%) of canned tuna (sardines) are imported → trade impact
 - Concerned consumers vs. others. Health attributes' valuation: Lab experiment
 - **Simulation results:**
 - ✓ Increase in demand for sardines larger than decrease in demand for tuna → price increase for sardines larger than price decrease for tuna
 - ✓ Foreign producers of tuna negatively impacted, but loss lower than benefit for foreign sardine producers → Positive change in total foreign profits
 - ✓ Increase in concerned consumers surplus (better informed consumption choices)
 - ✓ Decrease in non-concerned consumers surplus (suffer from price changes)
- All in all, net welfare gain for households at risk; some losses for tuna producers and non-concerned consumers

Example: effects of a safety standard

- Standard banning antibiotics in shrimp aquaculture (Beghin et al., 2012)
- To be adopted by the EU. Concern only non-European producers
- RIA based on the CBA framework developed by van Tongeren et al. (2009)
- Value of the per-unit damage associated with foreign shrimps: based on a consumer choice experiment conducted in France in 2009
- **Simulation results:**
 - ✓ Domestic consumers benefit from the standard eliminating antibiotics
 - ✓ Foreign producers decrease their output (higher production costs); domestic producers increase their output
 - ✓ Foreign producers suffer from the standard only if consumers are unaware of antibiotics problem in shrimps before the standard implementation
 - ✓ Foreign producer benefit from the standard if consumers are fully aware (increase in consumer demand leads to higher prices and profits even for foreign producers)

1-2-2. Ex-post streamlining NTMs

World Bank's NTM streamlining toolkit (Cadot et al., 2012)

- Analytical method to assess costs and benefits of existing NTMs
- Help policy makers to build an adequate institutional setup for NTMs

Streamlining NTMs: four steps

1. Collect inputs from representatives of the private sector/civil society
2. Collect inputs from agencies in charge of NTMs (Cadot et al., 2012, questionnaire)
3. Formally analyse NTM effects. If sufficient and precise information in steps 1 and 2, quantify all trade and non-trade related costs and benefits of NTMs
4. Provide recommendation: keep NTMs unchanged, amend legal text of NTMs and/or its enforcement, remove/replace the NTMs?

Streamlining NTMs: institutional framework

Institutional framework – successful ingredients:

- Appropriate mandate for administration in charge of the process
- Participation of highest officials responsible for regulations
- Availability of technical and financial resources
- Review process to be conducted by a central and independent entity separate from the one responsible for issuing regulation. Transparent review
- Inclusion of all concerned stakeholders

Review process – 2 main approaches:

- Fast track tools (simplify NTMs & reduce their burden): Standard Cost Model, guillotine model, bulldozer approach
- Non-fast track tools (solve systemic problems related to NTM): scrap and build, staged repeal or “automatic revocation”, review and sunset clauses

Streamlining NTMs: successful country experiences

- Mexico, Mauritius, Indonesia (Cadot et al., 2012; Haddou, 2012)
- **2 main drivers**: i) Transparency; ii) Reduction in unnecessary trade barriers
 - Increase in competitiveness of domestic (small and medium) firms
 - Switch from close to open market-based economies
- **3 main lessons based on these experiences**:
 - ✓ Trade policy reform should be comprehensive and coherent
 - ✓ A central and independent entity should be in charge of the design and implementation of the trade reform. It should coordinate all the agencies involved
 - ✓ Trade competitiveness should be the main driver of regulatory review. Costs and benefits of NTMs should be assessed

Mexican experience

- Reform starts in the mid-80s
 - ✓ Reduction in tariffs/import licences, new & more transparent regulatory framework
 - ✓ Publication of all technical rules. Assessment of their costs & benefits (RIAs). Results to be approved by consultative committees (include private-sector representatives)
- New regulatory reform strategy in 1995. 3 main elements:
 - ✓ Full review of existing formalities; Central registry for all business formalities
 - ✓ Creation of 2 agencies: Economic Deregulation Council (regulatory reform policy); COFEMER (design and implementation of the regulatory reform policy)
 - ✓ Full review of all regulatory proposals having business impacts
- Over 2000s: simplification of conformity assessment procedures. Formal recognition of equivalence between Canadian, US, and Mexican safety standards for selected products

Mauritian experience

- Trade reform started in 2008. Aim: enhance competitiveness
- **2 pillars:**
 - 1/ Review of import and export permits
 - 2/ Establish a public-private review committee for NTMs, in charge of:
 - ✓ Full review of existing formalities; Central registry for all business formalities
 - ✓ Definition of the main principles of the regulatory reform
 - ✓ Review of all new and important existing regulations
 - ✓ Introduction of RIAs
 - ✓ Coordination among ministries
 - ✓ Implementation of information technology solutions for trade facilitation across ministries and agencies
- In 2012, creation of a joint public-private business facilitation task force.
Aim: coordinate the review process of business regulations (including NTMs)

Example: Mauritian import ban on adult anthurium plants

- **Context:**

- ✓ 2006: Mauritius bans imports of adult anthurium plants (blight bacterium)
- ✓ Ban addresses a market failure & complies with WTO rules

- **Ban's impact:**

- ✓ Industry representatives: domestic producers forced to import baby plant. Must be nurtured for up to 2 years before being productive → Capital immobilisation & competitiveness loss → export decrease
- ✓ But export decrease also due to low competitiveness of Mauritian anthurium production

- **Assessment in 2012 (World Bank's NTM streamlining toolkit):**

- ✓ Expected cost of lifting the ban (USD 19.2 million), while present discounted value of the cost of maintaining it (USD 6.7 million)
- ✓ Benefits for anthurium industry too low compared to environmental damage in case of an outbreak. Ban's removal not well-founded, even if it affects anthurium exports

Example: Mauritian import ban on toxic paint pigments

- **Context:**

- ✓ 2004: Mauritius bans imports of 2 toxic paint pigments. Substitutes exist but more costly
- ✓ Ban addresses a market failure (health & environment risks) & complies with WTO rules
- ✓ Ban focuses on pigments. Imports of paints produced using these toxic pigments not covered by the ban

- **Ban's impact:**

- ✓ Mauritian industry representatives: ban discriminates between domestic paint producers (subject to the regulation) and importers
- ✓ Ban raises production cost of paints by 2% to 40% (depending on the product) & reduces Mauritian producers' competitiveness on export markets

- **Conclusion of the assessment (World Bank's NTM streamlining toolkit):**

- ✓ Issue at stake: not the ban per se but its design → promotes a ban on the sales of paints using toxic pigments as inputs → avoid any discrimination

Example: Nigerian ban on 27 products

- **Context:**

- ✓ Until 2010: import ban on 27 products (including necessities such as exercise books and pencils, common pain killers)

- **Ban's impact:**

- ✓ Raises rents of domestic producers, encourages smuggling
- ✓ Decreases domestic consumer welfare and government tariff revenues

- **Conclusion of the assessment (World Bank's NTM streamlining toolkit):**

- ✓ Average price gap of 67% for banned products, after controlling for cost-of-living differences (Nairobi used as a comparator city for Lagos)
- ✓ Removing the ban is expected to have a pro-poor effect, create an overall real-income gain over 9%, and lift three millions Nigerians out of poverty

1-3. Border inspections

- Appropriate & well-targeted inspections: reduce incidence of border controls
- Efficient inspections should not be arbitrary/random but based on risk analysis
- Few but well-targeted inspections are sufficient to detect almost all unsafe products
 - ✓ Assess risk-profile of transactions using product and country's characteristics, history of previous inspections, etc.
 - ✓ Focus inspections on riskiest transactions
- Example: Hypothetical data (Grigoriou, 2012): 100,000 obs. (24.8% fraudulent)
 - ✓ Limiting number of inspections to under 30% of transactions leads to a 90% detection rate
 - ✓ Inspecting 50% of lower-risk transactions would only detect less than 2% of infringements

2- International Regulatory Convergence

Gravity estimation

- Simplest form: trade (X_{ij}) between 2 countries i and j depend on their respective economic size (M_i, M_j) and on geographical distance separating them (D_{ij})

$$\ln X_{ij} = \alpha \ln M_i + \delta \ln M_j - \theta \ln D_{ij}$$

- Different variables added to this formulation: common border, tariffs, PTA, etc.
- Comparison btw. predicted flows (without NTMs) & observed flows (with NTMs)

$$\ln x_{ijt} = \phi_{ijt} \ln(1 + tar_{ijt}) + \gamma' NTM_{jt} + \beta' z_{ij} + fe_i + fe_j + fe_t + \varepsilon_{ijt}$$

- With (can be also at the sector level):
 - ✓ i : exporting country, j : importing country, t : year
 - ✓ tar : applied tariff; NTM : dummy, frequency ratio, coverage ratio, AVE
 - ✓ z : bilateral gravity variables (distance,); fe : set of fixed effects

2-1. Heterogeneity in regulations across countries: regulatory distance and trade impact

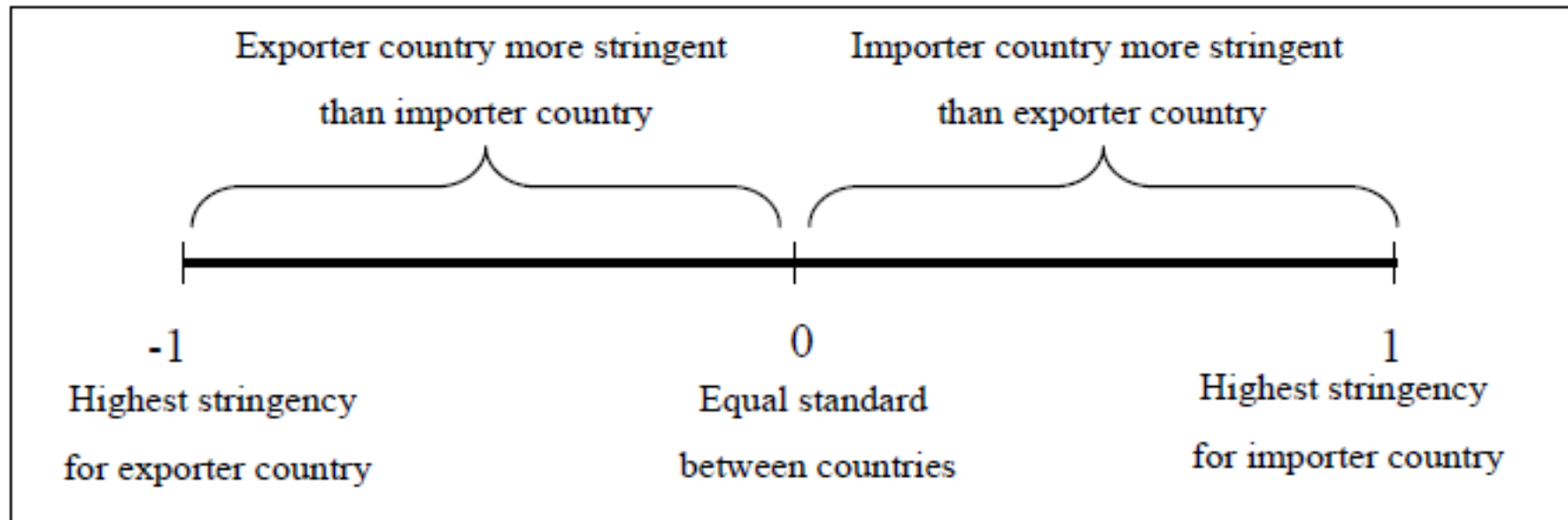
- Studies based on a heterogeneity index aggregating regulations (ordinarily based on MRLs) for different substances
- Trade effects obtained through the estimation of a gravity-like trade equation incorporating the index among explanatory variables
- Different methods used by the authors for the computation of the heterogeneity index
 - Cross-study comparison should be made with caution

Heterogeneity index of regulations

- Achterbosch et al. (2009) index:

$$r_n = \frac{MRLn_{\text{exp}} - MRLn_{\text{imp}}}{MRLn_{\text{exp}} + MRLn_{\text{imp}}}$$

Figure 1: Value range of stringency indicator for MRLs.



$$I_i = \frac{\sum_{n=1}^N r_n}{N}$$

Where N : number of pesticides included in the index

Table 2: Index of average differences in pesticide MRLs for selected fruit products required by Chile and EU.

Exported products	Stringency index ($I_{\text{Chile, EU15}}$)	Number of pesticides considered in the index (N)
Apples	0.55	48
Cherries	0.52	27
Blueberries	0.74	13
Grapes	0.49	41
Kiwifruit	0.53	15
Plums	0.54	24

- Impact of differences in MRLs on fresh fruit exports from Chile to EU15. 1996-2007
- Results: more similar MRL regulations with EU standards increase Chilean exports

Heterogeneity index of regulations: other examples

- Regulatory heterogeneity for i) veterinary drugs based on 207 MRLs, ii) pesticides aggregating 610 MRLs (Gervais et al., 2011):
 - ✓ Focus on the EU and 10 other countries
 - ✓ Differences in standards across countries reduce flows in pig meat and beef. No significant effect for cheese, fruits and vegetables. Positive impact for cereals and grains
- Plant products' flows btw. EU & 9 big partners, 2008-09 (Winchester et al., 2012)
 - ✓ Differences in most regulations weakly reduce trade
 - ✓ Stricter pesticide MRLs in one country relative to others reduce exports to that country
- Vegetable products (HS 07-12). Various samples of countries. 2005-2011. Impact on probability of trade and volume of trade (Foletti and Shingal, 2014):
 - ✓ Regulatory heterogeneity: negative and significant impact on both trade margins
 - ✓ Very strong effect at the extensive margin

2-2. Regulatory convergence in trade agreements: mechanisms and trade impact

- A growing number of PTAs (around 60%) includes provisions on SPS & TBTs
- How do regulations' trade effects interact with the presence of agreements
- Few investigations, but unanimous conclusion: IRC provisions tend to increase flows between members, but often with trade diversion effects
- Three IRC mechanisms: harmonisation, mutual recognition (or equivalence), transparency

Harmonization versus mutual recognition

- **Harmonization**: common regulation (international or national standard in force in one trading partner) in both countries
- **Mutual recognition**: reciprocal acceptance of the regulations applied in both countries. Mutual recognition can be on:
 - ✓ The regulation itself
 - ✓ The compliance techniques and/or conformity assessment procedures
 - ✓ The regulation's enforcement
- Both assumed to be trade-enhancing: scale economies & more efficient resource allocation (Chen & Mattoo, 2008)

Harmonization vs. mutual recognition (cont'd)

- **Harmonization: expected to boost trade more than mutual recognition**
 - ✓ Common standards → Higher homogeneity & substitutability between products
 - ✓ Higher compatibility btw. imported & domestic products
 - ✓ Common standards → lower information costs & higher trust in foreign products' quality
- **But, harmonization can have a negative trade impact that can be avoided through mutual recognition**
 - ✓ Harmonization reduces number of varieties
 - ✓ Harmonization may generate compliance costs that vary for different countries
 - Harmonization's gains not equally distributed among countries
- **Mutual recognition**
 - ✓ Equal distribution of gains from removing NTMs among countries
 - ✓ No adaptation costs → If such costs are high, mutual recognition should boost trade more than harmonization

Potential impact on third countries

- **Regional harmonization & mutual recognition affect countries outside PTAs differently**
 - ✓ Harmonized standards allow entry into the whole regional market (to PTA members but also to third countries)
 - ✓ Mutual recognition may not provide access to third countries
 - ✓ PTAs involving mutual recognition & strict rules of origin are likely to have trade-diverting effects for third countries

Empirical evidence (1)

- Sample: 3-digit industry data for 42 countries (28 OECD countries and 14 non-OECD countries), 1986-2001, gravity equation (Chen and Mattoo, 2008)
- 8 MRAs and 24 harmonisation directives
- **Impact on trade between member countries:**
 - ✓ Harmonisation and MRAs increase probability and volume of trade
 - ✓ Larger effects for MRAs (especially without rules of origin) than for harmonisation
- **Impact on trade with third countries:**
 - ✓ Impact of harmonisation on a third country's exports positively correlated with country's ability to meet standards (measured with GDP/cap. and R&D expenditures)
 - ✓ Firms in developing countries are hurt by standards stringency and benefit less from the economies of scale in integrated markets
 - ✓ For MRAs, trade effects driven by rules of origin:
 - MRAs without rules of origin increase imports from third (developed and developing) countries
 - MRAs with rules of origin decrease imports from non-member countries (in particular from developing ones)

Regionalism in standards (Chen and Mattoo, 2008)

The asymmetric effects of harmonization and MRAs across third countries by GDP per capita

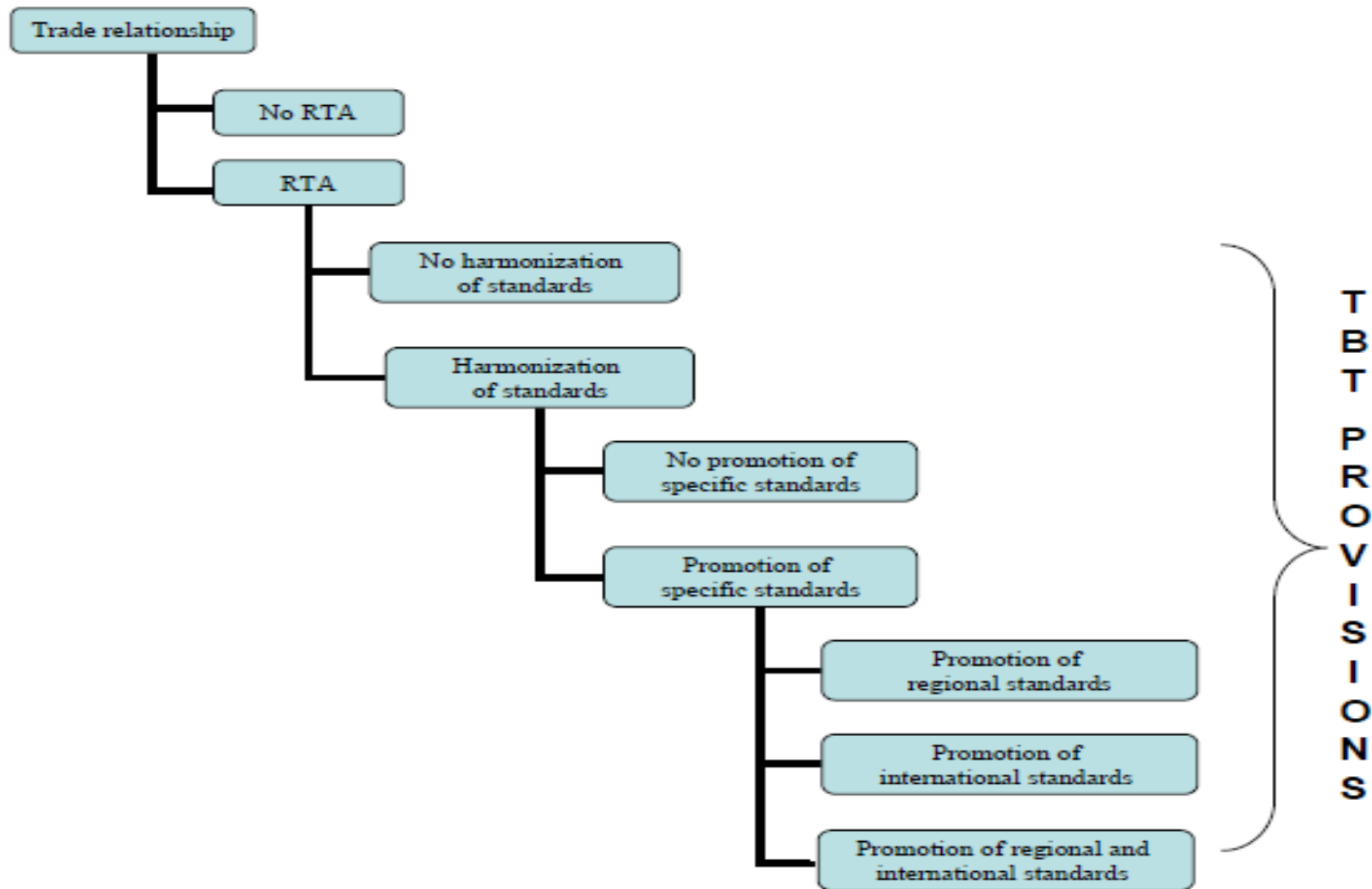
Explanatory variables	Stage 1	Stage 2
	Decision to trade	Trade volume
Presence at the export market at $t - 5$ (IV)	0.76*** (0.001)	—
Harmonization on intra-regional trade (<i>HAR</i>)	0.01*** (0.001)	0.20*** (0.013)
Harmonization on imports from the ROW (<i>HAR_M</i>)	−0.06*** (0.005)	−0.66*** (0.072)
× GDP per capita	0.007*** (0.001)	0.02*** (0.008)
MRAs with rules of origin on intra-regional trade (<i>MRA_RO</i>)	0.05*** (0.003)	0.36*** (0.066)
MRAs with rules of origin on imports from the ROW (<i>MRA_RO_M</i>)	−0.11*** (0.018)	−0.49*** (0.220)
× GDP per capita	0.007*** (0.002)	0.04* (0.02)
MRAs without rules of origin on intra-regional trade (<i>MRA_NRO</i>)	0.18*** (0.008)	3.22*** (0.125)
MRAs without rules of origin on imports from the ROW (<i>MRA_NRO_M</i>)	0.02 (0.02)	4.07*** (0.339)
× GDP per capita	0.0004 (0.003)	−0.35*** (0.036)
λ	—	5.89***
Number of observations	4,135,588	2,784,952
R squared	0.67	0.39
Root MSE	0.38	3.17

NOTES: (i) Exporter/Importer-industry-year, country pair-industry, and country pair-year fixed effects are controlled; (ii) standard errors, clustered at the country pair-industry level, are reported in parentheses; (iii) ***, **, and * represent 1%, 5%, and 10% significance levels, respectively.

Empirical evidence (2)

- Focus on TBT provisions in North-South PTAs
- Aggregate Southern exports to the North. 1990-2006. 43 North-South trade agreements. Gravity equation. Disdier et al. (2015)
- **Adoption by DCs of stringent standards imposed on Northern markets**
 - ✓ Can raise product quality but at a cost
 - ✓ 2 opposite effects for out-of-bloc exports of Southern members:
 - Higher quality can raise outside demand for their products
 - Higher costs can exclude them from outside (Southern) markets
- **Which effect dominates?** Empirical question: depends on how specific the standards are

TBT provisions in North-South PTAs



TBTs provisions in North-South PTAs: legal texts

Harmonization on regional standards

- Article 51 of European Community-Morocco Agreement:

“[t]he Parties shall cooperate in developing: (a) the use of Community rules in standardisation, metrology, quality control and conformity assessment; (b) the updating of Moroccan laboratories, leading eventually to the conclusion of mutual recognition agreements for conformity assessment [...]”

- Article 51 of the EC-Tunisia EIA is identical

Harmonization on international standards

- Article 19 of the EC-Mexico:

Parties “shall work towards: [...] (c) promoting the use of international standards, technical regulations and conformity assessment procedures on the basis of international agreements.”

- Same clause in Article 705 of the Australia-Thailand

North-South PTAs and trade coverage

N-S RTAs and Trade[#] coverage

	Nb	1990 Trade coverage (%)	Nb	1999 Trade coverage (%)	Nb	2006 Trade coverage (%)
RTAs	4	0.4	12	15.8	43	19.5
Of which RTAs with standards harmonization						
Harmonization of technical regulations	0	0	5	14.2	21	15.7
Promotion of the use of regional standards	0	0	2	2.1	8	4.4
Promotion of the use of international standards	0	0	2	12.1	12	11.8

[#]: Northern imports from the South

Source: Disdier, Fontagné and Cadot (2015)

TBT harmonization in North-South PTAs & trade: lessons

- **North-South trade:**

- ✓ Harmonisation to international standards increase Southern exports to the North
- ✓ But, harmonisation to regional standards decrease Southern exports to the North

- **South-South trade:**

- ✓ Provisions on harmonisation included in North-South trade agreements reduce exports of Southern members to other Southern countries
- ✓ If price elasticity of demand = -2, AVE of standards harmonisation close to 10% (equivalent to a 10% export tax)

- **North-South standard harmonization:**

- ✓ Affect trade integration of Southern countries into world economy
- ✓ Favors a hub-and-spoke trade structure, which may be harmful for Southern countries

Empirical evidence (3): price effects quantification

- Indirect analysis: Do IRC mechanisms dampen the price-raising effect of NTMs?
- Impact of harmonisation within PTAs on NTM AVEs (Cadot and Gourdon, 2016)
 - ✓ Data on trade unit values, NTMs and PTAs
 - ✓ 70 PTAs (58 with NTM provisions). HS 6-digit (5,000 products). 65 countries, 2011 or 2012
- **PTAs reduce price-raising effects of NTMs:**
 - ✓ On average, PTAs reduce AVEs of SPS by 0.6 percentage points
 - ✓ On average, PTAs reduce AVEs of TBT by 1.5 percentage points
 - ✓ Stronger cost-reducing effect for mutual recognition of conformity assessment than for harmonisation
- **3 explanations:**
 - ✓ NTM convergence within PTAs reduce compliance costs
 - ✓ Within PTAs: more information → more demand & lower price effect of NTMs
 - ✓ PTAs reduce protectionist-motivated distortions in NTM design

NTMs' AVEs and PTAs: results

	AVE without RTA			AVE with RTA			AVE change				
	SPS (A)	TBT (B)	Total	SPS (A)	TBT (B)	Total	Absolute (percent. points)		Proportional (percent of baseline)		
	SPS (A)	TBT (B)	Total	SPS (A)	TBT (B)	Total	SPS (A)	TBT (B)	SPS (A)	TBT (B)	Total
Animals	11.6	9.2	20.8	8.5	7.8	16.4	-3.1	-1.3	-26.7	-14.5	-21.3
Vegetables	9.9	10.3	20.3	9.3	6.6	15.8	-0.7	-3.8	-6.7	-36.4	-21.9
Fats & oils	8.9	8.4	17.3	4.9	7.8	12.6	-4.0	-0.6	-45.4	-7.6	-27.0
Beverages & tobacco	8.1	8.4	16.5	6.6	5.3	11.9	-1.5	-3.1	-18.4	-37.3	-28.1
Minerals	1.6	7.8	9.4	1.6	5.2	6.8	0.0	-2.6	0.2	-33.4	-27.6
Chemicals	1.0	7.0	7.9	0.8	4.6	5.4	-0.1	-2.4	-13.6	-34.2	-31.7
Plastics	1.2	5.8	7.0	1.1	3.9	5.0	-0.1	-1.9	-9.1	-33.1	-29.0
Leather	2.7	3.7	6.5	1.6	2.5	4.2	-1.1	-1.2	-40.7	-31.9	-35.7
Wood products	4.5	2.1	6.5	4.1	1.5	5.7	-0.4	-0.5	-8.0	-24.7	-13.3
Paper	0.7	2.5	3.3	0.5	1.6	2.1	-0.2	-0.9	-24.3	-37.3	-34.5
Textile and clothing	0.9	4.8	5.6	0.7	3.6	4.3	-0.2	-1.2	-18.0	-24.5	-23.5
Footwear	0.7	4.3	5.0	0.6	2.6	3.2	0.0	-1.7	-6.7	-40.4	-35.9
Stone & glass	1.5	4.9	6.4	1.4	3.7	5.1	-0.1	-1.2	-8.2	-23.9	-20.2
Pearls	1.0	4.3	5.3	0.8	4.2	5.0	-0.2	-0.1	-21.3	-2.1	-5.6
Metals	1.2	4.6	5.8	1.0	2.9	3.9	-0.2	-1.6	-18.5	-35.8	-32.2
Machinery	1.5	5.2	6.7	1.2	3.6	4.8	-0.3	-1.6	-19.2	-30.6	-28.0
Vehicles	0.4	8.9	9.3	0.4	7.5	7.9	-0.1	-1.4	-15.5	-15.4	-15.4
Optical & med. Instr.	0.8	7.5	8.3	0.7	6.0	6.6	-0.1	-1.6	-10.6	-20.8	-19.9
Arms	0.0	0.5	0.6	0.0	0.5	0.6	0.0	0.0	0.0	0.0	0.0
Miscellaneous	0.6	4.9	5.5	0.5	3.4	3.9	-0.1	-1.5	-17.7	-30.6	-29.2
Work of Arts	0.0	2.7	2.7	0.0	1.7	1.7	0.0	-1.0	0.0	-37.8	-37.8
Average	2.8	5.6	8.4	2.2	4.1	6.3	-0.6	-1.5	-21.2	-26.5	-24.8

Note: Estimation carried out by OLS, product by product at HS6, with destination covariates.

NTMs' AVEs and PTAs: results (cont'd)

	Proportional change (percent of baseline)														
	Mutual Recognition of Technical regulation			Harmonization of Technical regulation			Mutual Recognition of Conformity assessment			Harmonization of Conformity assessment			Transparency requirement		
	SPS (A)	TBT (B)	Total	SPS (A)	TBT (B)	Total	SPS (A)	TBT (B)	Total	SPS (A)	TBT (B)	Total	SPS (A)	TBT (B)	Total
Animals	-0.6	-10.8	-5.3	-14.7	-14.2	-14.5	-19.3	-20.2	-19.7	-14.1	-14.9	-14.5	-21.6	-13.9	-17.7
Vegetables	0.5	-8.7	-3.1	-15.8	-15.1	-15.5	-12.7	-38.3	-26.1	-15.6	-26.5	-20.6	-2.9	-33.5	-15.4
Fats & oils	-16.0	-23.1	-20.5	-28.6	13.2	-1.6	-16.3	-11.3	-13.4	-26.7	11.2	-2.5	-43.0	-24.6	-33.3
Beverages & tobacco	-3.6	0.8	-1.6	-24.0	-44.3	-32.8	-25.2	-46.0	-36.4	-16.9	-36.8	-25.9	-26.5	-18.7	-22.9
Minerals	0.0	-4.9	-4.1	0.0	-22.8	-19.4	0.2	-26.4	-22.0	2.8	-21.3	-17.2	5.3	-10.5	-8.0
Chemicals	4.6	-13.3	-10.9	-8.6	-30.7	-27.3	-12.6	-33.5	-31.0	-4.7	-23.5	-20.2	-6.2	-26.1	-23.6
Plastics	-4.8	-22.7	-18.8	-5.6	-21.4	-18.1	-12.2	-40.5	-36.0	-6.4	-27.8	-23.5	-2.7	-24.3	-19.9
Leather	-17.7	-15.0	-16.4	0.0	6.1	3.2	-19.6	-31.5	-26.4	2.3	-0.1	1.0	-20.4	-16.1	-18.4
Wood products	-6.8	78.7	1.8	-9.2	0.0	-6.6	4.0	-25.4	-5.3	-9.2	0.0	-6.8	-5.3	-59.5	-17.8
Paper	1.6	13.1	9.4	4.0	3.7	3.8	-18.4	-41.5	-36.1	5.0	-30.1	-19.9	4.4	-16.8	-10.5
Textile and clothing	-0.5	-18.3	-15.1	-1.8	-31.7	-26.8	-14.9	-21.7	-20.7	-2.3	-30.1	-25.2	-2.0	-20.9	-17.5
Footwear	0.0	-21.8	-18.7	0.0	-64.9	-56.3	-2.8	-35.9	-31.8	0.0	-78.7	-67.7	0.0	-50.3	-43.6
Stone & glass	-1.3	-0.6	-0.8	0.0	-15.7	-11.7	-3.6	-16.8	-13.3	0.4	-8.7	-6.2	2.1	-19.2	-13.7
Pearls	0.0	-7.4	-5.9	-16.1	-18.1	-17.7	-22.9	-9.3	-12.0	-16.3	-15.6	-15.7	0.0	-8.8	-7.2
Metals	-1.7	-11.0	-8.8	-3.9	-17.1	-13.5	-15.5	-26.2	-24.0	-3.3	-15.3	-11.7	-3.9	-31.4	-25.6
Machinery	-2.5	-7.6	-6.3	-6.5	-29.0	-24.2	-19.1	-29.1	-26.7	-5.1	-24.4	-19.6	-4.1	-22.1	-17.8
Vehicles	-1.1	-6.8	-6.6	-10.5	-29.9	-29.1	-14.8	-18.0	-17.9	-1.9	-29.1	-27.7	0.6	-14.1	-13.6
Optical & med. Instr.	0.0	-10.6	-9.8	0.4	-24.4	-22.0	-10.1	-21.4	-20.4	0.4	-6.4	-5.7	0.6	-15.0	-13.7
Arms	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Miscellaneous	0.1	-12.9	-11.5	0.4	-16.2	-13.8	-21.6	-30.5	-29.6	-1.1	-21.8	-18.7	6.8	-6.0	-4.6
Work of Arts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-40.3	-40.3	0.0	0.0	0.0	0.0	-40.0	-40.0
Average	-3.6	-9.9	-7.7	-13.6	-20.3	-18.0	-15.1	-27.6	-23.6	-11.8	-20.0	-17.2	-15.4	-21.1	-19.1

Source: Cadot and Gourdon (2015)

2-3. Harmonisation to international standards: mechanisms and trade impact

- Usually, international standards less trade-inhibiting than domestic or regional ones → smaller negative trade impact and even, in some cases, a positive one (not confirmed by all studies)
 - International standards do not lock exporters into trade relationships
 - **But, domestic use of international standards may be challenging**
 - ✓ Domestic regulators may not know which & how to use the international standards
 - ✓ They may also find them not fully appropriate to the domestic context and may therefore modify them
- Such inconsistencies may reduce transparency and may not help the reduction of trade costs (OECD, 2016b)

Empirical evidence (1): Codex alimentarius standard

- New harmonised aflatoxin standard proposed by the EU in 1998 on African exports (Otsuki et al., 2001)
- Ex-ante simulation of its trade impact
- Comparison with the international standard (Codex Alimentarius)
- 15 EU countries & 9 African countries (Chad, Egypt, Gambia, Mali, Nigeria, Senegal, South Africa, Sudan, and Zimbabwe). 1989-1998
- **Results:**
 - ✓ EU standard will reduce African exports of cereals, dried fruits and nuts to Europe
 - ✓ Moving from Codex Alimentarius standard to new EU standard will decrease African exports of cereals, dried fruits, and nuts to Europe by 64% (USD 670 million)
 - ✓ Very limited gains in terms of health risk reduction (1.4 deaths per billion a year)
 - ✓ Issues: tariffs/endogeneity/zero flows not accounted for

MRLs' harmonization within EU (cont'd)

- Estimated gravity equation

$$\ln(M_{ij}^k) = b_0 + b_0^k + b_1^k \ln(PCGNP_i) + b_2^k \ln(PCGNP_j) + b_3^k \ln(DIST_{ij}) + b_4^k Year + b_5 COL_{ij} + b_6 \ln(ST_i^k) + \varepsilon_{ij}^k$$

- M_{ij}^k : exports from African country j to EU member i on product k
- $PCGNP$: per capita GNP in 1995 USD. COL : colonial tie dummy
- ST_i^k : maximum aflatoxin level on product, k , in EU country i
- Elasticity of aflatoxin standards on export value from Africa

	Elasticity of standards
Cereals and cereal preparations	1.0517**
Fruits, nuts and vegetables	
Coconuts, Brazil and cashew nuts	0.7419*
Groundnuts and other edible nuts	1.2950**
Dried or preserved fruits	0.7705**

Note: ** and * : significance at 5 and 10%. Source: Otsuki et al. (2001)

MRLs' harmonization within EU: simulations

- Simulation of trade effects of standards harmonization

$$dM_{ij}^k = \tilde{b}_6 \frac{M_{ij}^k}{ST_i^k} (ST_i^{k*} - ST_i^k)$$

- M_{ij}^k : exports from country j to EU member i in 1998 (before harmonization)
- dM_{ij}^k : predicted change in trade following harmonization
- b_6 : estimated coefficient on aflatoxin NTM (cf. previous slide)
- ST_i^k : max. aflatoxin level on product, k , in EU country i (before harmonization)
- ST_i^{k*} : max. aflatoxin level associated with a regulatory scenario (new EU standard, Codex standard)

MRLs' harmonization within EU: trade effects

Predicted trade flows under alternative scenarios: Cereals

	The Value of import in 1998	Predicted change in the value of import		Predicted value of import		Difference between the the two scenarios (%)
		EU standard	CODEX standard (assumed level)	EU standard	CODEX standard (assumed level)	
	(US\$ million)	(US\$ million)	(US\$ million)	(US\$ million)	(US\$ million)	(%)
Austria	5	+5	+5	10	10	0
Belgium -Luxembourg	16	-10	+13	6	29	80
Denmark	5	+0	+5	5	11	50
Finland	3	-1	+3	2	5	61
France	146	-92	+123	54	270	80
Germany	10	0	+10	10	20	50
Ireland	5	-3	+4	2	9	80
Italy	35	-22	+29	13	65	80
Netherlands	13	-8	+11	5	24	80
Norway	na	na	na	na	na	na
Portugal	37	-35	-22	2	16	87
Spain	16	-10	+13	6	29	80
Sweden	3	-1	+3	2	6	61
U.K.	3	0	+3	3	7	50
EU	298	-177(-59%)	+202(+68%)	120	500	76

Source: Otsuki et al. (2001)

MRLs' harmonization within EU: trade effects (cont'd)

Predicted flows under various scenarios: Dried fruits & nuts

	The Value of import in 1998	Predicted change in the value of import		Predicted value of import		Difference between the the two scenarios (%)
		EU standard	CODEX standard (assumed level)	EU standard	CODEX standard (assumed level)	
	(US\$ million)	(US\$ million)	(US\$ million)	(US\$ million)	(US\$ million)	(%)
Austria	6.3	+4.9	+6.3	11.2	12.6	11
Belgium -Luxembourg	13.4	-7.1	+9.3	6.4	22.7	72
Denmark	7.4	0.0	+7.4	7.4	14.9	50
Finland	2.9	-0.6	+2.9	2.4	5.8	60
France	361.5	-177.0	+8.2	184.5	369.7	50
Germany	10.9	0.0	+10.9	10.9	21.8	50
Ireland	3.7	-2.3	+3.0	1.4	6.7	80
Italy	17.4	-8.6	+11.4	8.8	28.8	70
Netherlands	10.8	-5.9	+7.7	5.0	18.6	73
Norway	18.5	-17.5	-14.2	1.0	4.3	76
Portugal	6.7	-4.3	+1.7	2.4	8.4	71
Spain	4.5	-1.8	+3.3	2.7	7.8	65
Sweden	4.1	-0.3	+4.1	3.8	8.1	53
U.K.	4.1	0.0	+4.1	4.1	8.3	50
EU	472	-220(-47%)	+66(+14%)	252	539	53

MRLs' harmonization within EU: lessons

- Moving from Codex Alimentarius standard to more stringent uniform European standard decreases African exports to Europe by USD 670 million

	Relative to CODEX	Relative to pre-EU harmonization (1998 trade)
Loss in value of African exports (cereals, dried fruits, nuts)	USD 670 millions	USD 340 millions
Number of cancer deaths saved	2.3 persons	0.9 persons

- But many drawbacks. Results not confirmed by Xiong and Beghin (2012)
 - ✓ Ex-post econometric estimation of these trade effects
 - ✓ No evidence of EU MRL having a significant negative impact on African groundnut exports
 - ✓ African groundnut exporters more constrained by domestic supply conditions (e.g. farming and storage practices) than by EU regulations

Empirical evidence (2): ISO certification

- ISO standards may increase trade by lowering information asymmetries between firms
- ISO standards may introduce market-entry barriers and hamper international trade flows
- **Mixed results:**
 - ✓ ISO Standards enhance trade, especially exports of developing countries to developed countries (Clougherty and Grajek, 2008, panel of 52 OECD and non-OECD countries, 1995-2002)
 - ✓ But hinder trade if costs related to certification outweigh trade promoting effects (Clougherty and Grajek, 2014, 91 countries, 1995-2005: ISO standards reduce exports from developing/transition countries to developed ones)

Empirical evidence (3): firm exports

- Exports of firms from Pakistan (Masakure et al., 2009)
- Effects of ISO certification on export sales and share of exports (relative to total sales) for firms in textile, leather, and the agri-food sectors, 2000-04
- Propensity score matching (to control for firms' self-selection into ISO certification process)
- **Results:** export performance positively correlated with ISO certification. New exporters gain more from certification than incumbents

Empirical evidence (4): A counterexample

- International standards may impose adaptation costs that strangle trade
 - Adoption by East African Community of dairy standards based on the international Codex Alimentarius (Jensen and Keyser, 2012)
 - Data: desk research and fieldwork conducted in Rwanda, Uganda and Kenya in 2009 (interviews with stakeholders)
 - **Results:**
 - ✓ Harmonisation leads to very requirements → regional trade in dairy products is likely to be largely stifled
 - ✓ Dairy sector in these countries dominated by small producers not able to comply with new and stringent regulations
- Harmonisation process may reduce flows it was designed to facilitate

3. Multilateral disciplines

Framework

- **International organisations (IOs): key role in IRC (OECD, 2016a & 2016b):**
 - ✓ Facilitate set-up of adequate frameworks for NTMs between their members
 - ✓ Provide technical assistance to their members
- Diversity: inter-governmental, supra-national, trans-governmental, private IOs
- **Action of IOs effective, but...**
 - ✓ Active in upstream activities (information exchange, data collection, NTM definition), but less involved in downstream activities (enforcement, inspections, dispute settlement)
 - ✓ Rule-making mainly based on non-legally binding tools
 - ✓ Limited association of stakeholders (selection bias? quality of consultation?)
 - ✓ Few impact evaluation. Ex-post evaluations more used than ex-ante RIAs
 - ✓ Some overlap between regulatory policies. Definition of joint regulations remains limited

Example: UNECE Recommendation L

- Recommendation L promotes cooperation/harmonisation of regulations (Arvius & Jachia, 2015). Main element: common regulatory objectives (CROs)
- **Example: UNECE Initiative on Equipment for Explosive Environments** (mines, offshore platforms, chemical and energy plants).
Launched in 2006, objective: ensure safety of these high-risks facilities
 - ✓ Initial review: strong divergences in regulatory systems in force in countries
 - ✓ CROs approved in 2010 (requirements for producers of equipment used in these environments and for owners/operators of plants in which this equipment is used)
 - ✓ CROs: reference to international standards and how compliance should be assessed
 - ✓ One year after their approval, CROs enshrined by policymakers from Australia, Brazil, the EU, the Russian Federation, and the US

Example: OECD Environment, Health & Safety programme

- Established in 1978. Aim: Help OECD governments and chemical industries to reduce trade barriers and to cooperate for the testing and evaluation of chemicals, pesticides, biotechnology and nanotechnology products
 - **Cost and benefit assessment (OECD, 2010):**
 - ✓ Costs: OECD governments and participating industries' expenditures for the programme: Euros 15.23 million per year
 - ✓ Benefits: Euros 168.24 million per year
 - Reducing repeat testing for new substances (Eur 162.22 million/year)
 - Harmonising industry dossiers for pesticides registration (Eur 1.55 million/year)
 - Harmonising country review reports for pesticide registration (Eur 2.41 million/year)
 - Sharing the burden of high production volume chemicals testing and reviews (Eur 2.06 million/year)
- Cost savings to governments and industry around EUR 153 million per year

OECD Seeds Schemes

- Aim: harmonisation of certifications and mutual recognition of certified seeds (OECD, 2016c)
- Sample: 215 countries (57 members of at least one OECD seed scheme), 29 products. 1995-2014. 2 schemes: grass and legume, maize and sorghum
- **Results: significant trade effects**
 - ✓ Accessing seed scheme allows exporters to increase their exports in value (+12%) and in volume (+8%), and to achieve higher prices by trading higher quality seeds
 - ✓ If both partners are members of the same seed scheme, trade effect in value and volume is even bigger (above 30%)
 - ✓ Trade diversion effects: A country joining a seed scheme imports (exports) less from non-members, i.e. -6% (-14% in value, -19% in volume)

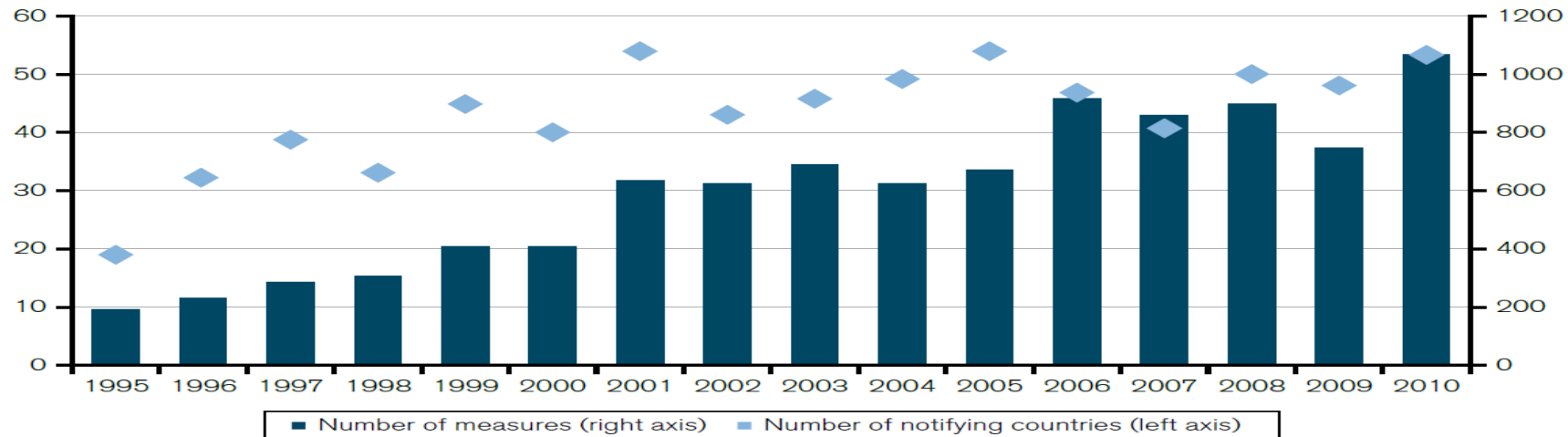
3-1. WTO SPS and TBT Committees

- Catalyst role played by the WTO SPS and TBT Committees (Wijkström (2015) and OECD (2016d))
- SPS and TBT Committees provide guidance in regulatory decision making by countries
 - ✓ Prompt participation of WTO members – especially developing countries – in definition of international regulations and conformity assessment procedures
 - ✓ Prompt mutual recognition of regulations
 - ✓ Encourage countries to notify their regulatory measures
- Both committees are a forum to discuss specific trade concerns (STCs) and address NTMs causing trade frictions between countries

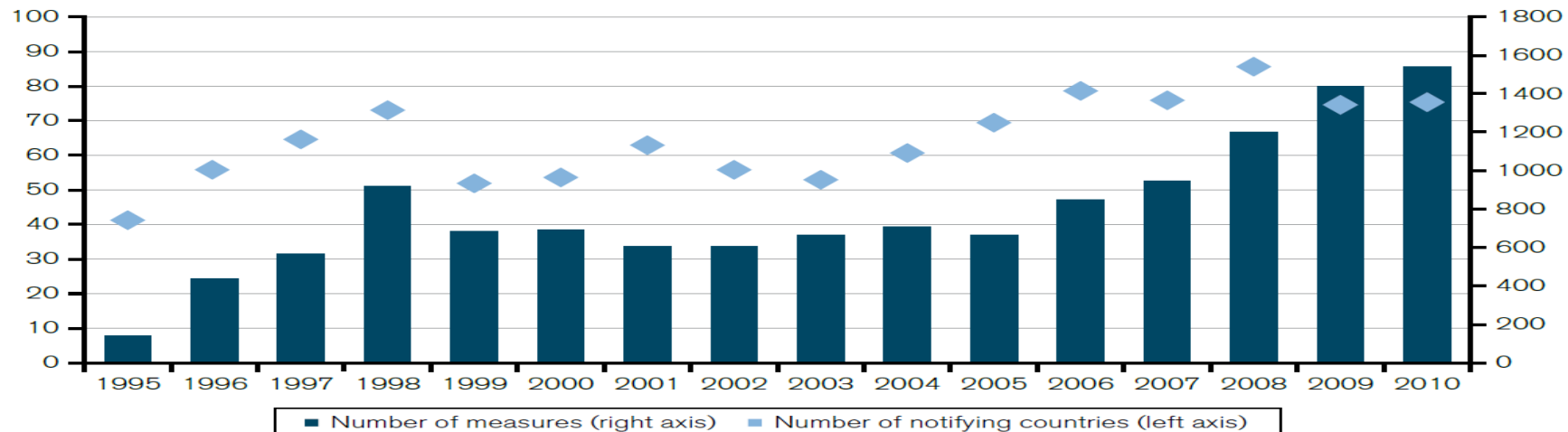
WTO SPS & TBT notifications (1995-2010)

Number of measures & number of notifying countries

(a) SPS



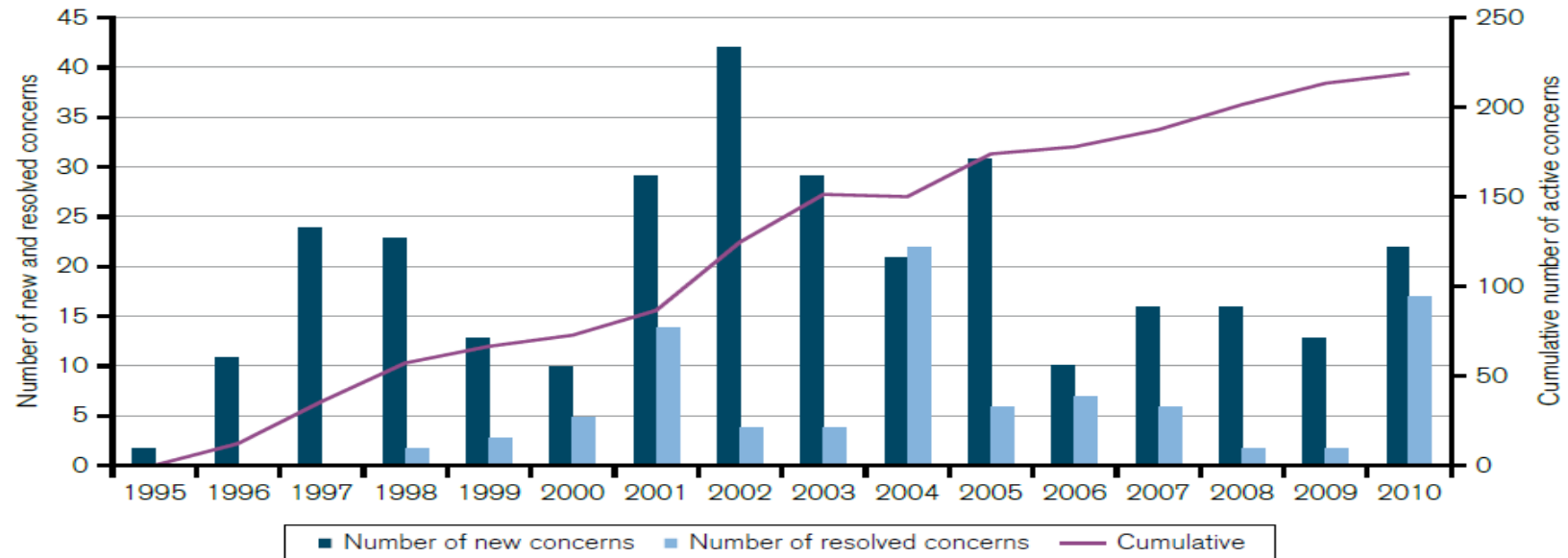
(b) TBT



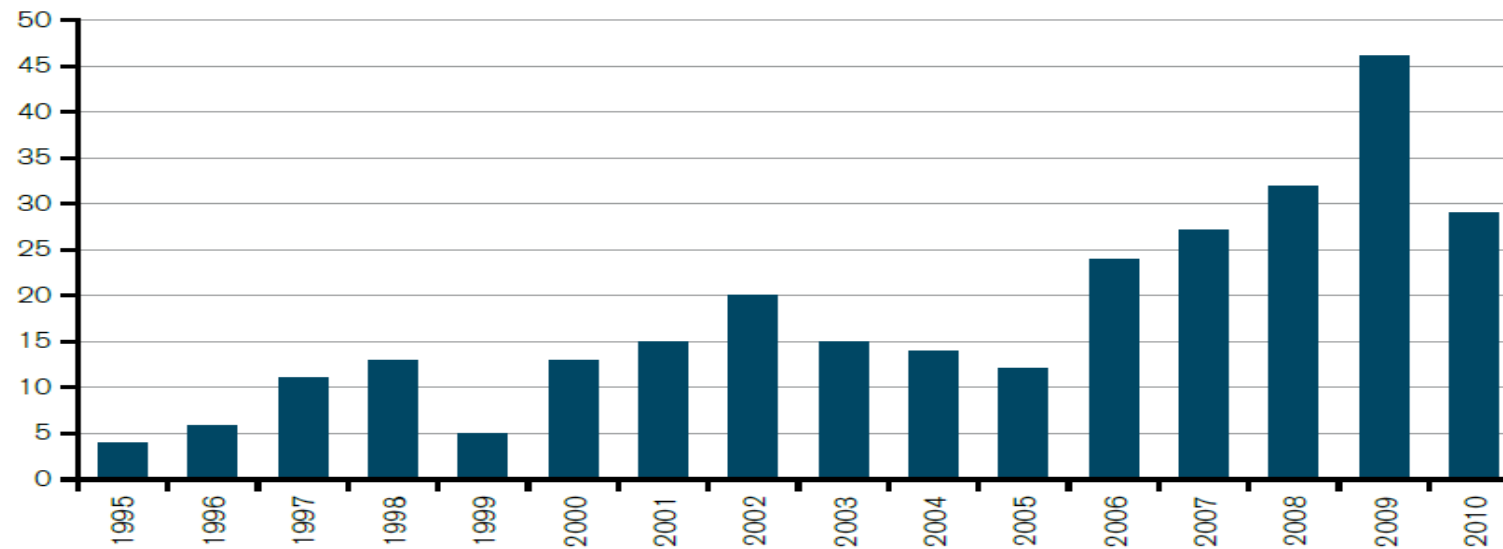
Based on WTO notifications (WTO I-TIP database). Source: WTO (2012)

SPS and TBT trade concerns

SPS concerns



TBT concerns



Based on WTO STC database. Source: WTO (2012)

FAO/WHO Codex Alimentarius Programme

- Aim: develop objective and science-based food standards
- WTO SPS Agreement identifies Codex Alimentarius as a relevant standard-setting organisation & promotes use of Codex standards
- **Formal evaluation in 2012 based on questionnaires and country visits:**
 - ✓ Codex standards widely used by countries. Seen as trade facilitators
 - ✓ Majority of countries have adopted more than 60% of all types of Codex standards (except those relating to methods of analysis)
 - ✓ Codex standards perceived as most useful for low and middle-income countries whose domestic regulations are not yet as developed
 - ✓ For 77% of countries (91.4% of low-income countries), Codex standards are very important to facilitate food exports
 - ✓ For 82.3% of countries, Codex standards are also very important for ensuring the safety of food imports

3-2. Aid for Trade Programmes

- Current Aid for Trade not adapted to regulatory coordination and regulation improvement (Cattaneo, 2015)
- Current support for trade policy & regulation: 3% of total Aid for Trade
- Recently, strong development of GVCs

→ **To help developing countries to participate to GVCs, Aid for Trade should move from “trade” to “trade and competitiveness”**

- ✓ Enhance cooperation with private sector
- ✓ Better target Aid for Trade
- ✓ Help developing firms to fulfil regulations enforced in exporting markets
- ✓ Assist firms to assess the conformity of their products with regulations and reduce costs of standards-compliance procedures

Successful Aid for Trade Programmes

- The Global Food Safety Initiative (GFSI) programme:
 - ✓ Target: small and/or less developed businesses
 - ✓ Provides certifications. Once certified, products recognized everywhere
 - ✓ In 2013, more than 85,000 certificates were issued in 162 countries
- In 2012, World Bank launched the first public-private partnership on food safety: creation of a multi-donor trust fund for a Global Food Safety Partnership for the Asia-Pacific Economic Cooperation
- UTZ Certified programme:
 - ✓ Initiated by the private sector. Aim: raise standards and sustainability of farming
 - ✓ Funded by public (Netherlands and Ireland) and private (Ford Foundation) donors

Conclusion

- Promote the use of IRC mechanisms by countries and international organisations
- Systematically investigate the trade effects of regulations
- Define the appropriate level of implementation for IRC mechanisms
- Define the relevant framework for the quantitation of IRC mechanisms
- Perform robust quantitative analyses
- Promote transparency
- Account for the effects on third countries
- Assist developing countries
- Promote the role of international organisations