No Double Standards: Quantifying the Impact of Standard Harmonization on International Trade

(previous title: Non-tariff Barriers to Trade: Measuring the Gains From Standard Harmonization)

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Introduction

Fact: Non-Tariff Barriers (NTB) in the form of standards are one of the main obstacles to international trade, see World Trade Report by WTO (2012).

This paper is the first to quantify the impact of a change in NTBs in the form of standard harmonization on international trade.

- construct a cross-country standard database and track harmonization events.
- construct a concordance table to link the International Standard Classification (ICS) codes to the international trade codes (Harmonized System (HS)).
- with regards to existing studies, we improve in terms of identification, coverage and industry-level mapping.

Our approach

Our empirical approach is based on a standard Melitz model of international trade. Within this framework, we think of standard harmonization as a change in fixed and/or variable costs.

Examples of cost-enhancing effects due to harmonization:

- Increases in production costs because of meeting quality/safety standards.
- Increases in production costs in order to adapt to a new production structure.

Examples of cost-reducing effects due to harmonization:

- Economies of scale and scope
- Externalities due to interoperability
- Reduction in border processing time

The effect of standard harmonization on international trade flows is mainly an empirical question.

- The model allows us to infer changes in the cost structure through changes in the extensive margin (entry and exit of products) and intensive margin (average sales per product).

Data sources

Standard data from the Searle Center at Northwestern University.

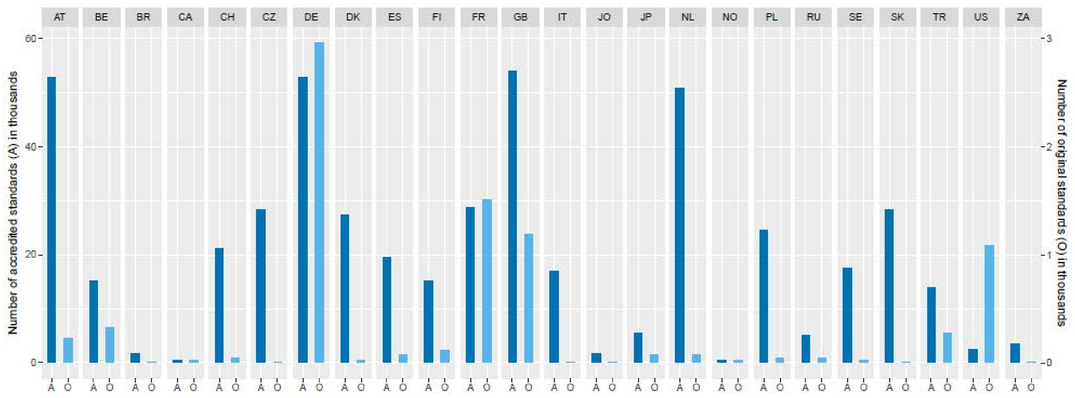
- information on equivalences of standards across 24 countries

Trade data from Comtrade (United Nations)

- 4-digit HS code (1260 products) is our level of aggregation

Use keyword matching techniques to create a correspondence table in order to map 5-digit ICS codes into 4-digit HS codes.

Figure 1: The number of original standards (O) versus the number of standards accredited (A) by country.



Stylized facts

Germany (DE), France (FR), Great Britain (GB) and the United States (US) are main originators of standards, see light blue bars in Figure 1.

Austria (AT), Germany (DE), Great Britain (GB) and the Netherlands (NL) are the main accreditors of standards, see dark blue bars in Figure 1.

In terms of sectoral heterogeneity, harmonization is mostly done in Materials, Engineering and Construction.

Standards are quickly harmonized after their issuing date (62% within same year).

Econometric specification

We use a **difference-in-difference approach** and consider a harmonization event as an exogenous treatment. The main regression specification looks as follows:

$$Y_{ijkt} = \beta h_{ijkt} + f_{ikt} + f_{jkt} + f_{ijk} + f_{ijt} + \varepsilon_{ijkt}$$

- Y_{ijkt} represents the log of export value of product k from exporter i to importer j
  - We then decompose the bilateral trade flow into extensive and intensive margin à la Hummels and Klenow (2005)
- h_{ijkt} represents the harmonization event (treatment) and equals 1 if country i and j harmonize a standard in product k at time t and 0 otherwise
  - h_{ijkt} is a stock measure, i.e. in cases of multiple harmonization events within the ijk triplet, we add 1 for every event.
- f_{ikt} control for supply shocks (exporter-product-time fixed effects (FE))
- f_{jkt} control for demand shocks (importer-product-time FE)
- f_{ijk} control for time constant factors (exporter-importer-product FE)
- f_{ijt} control for bilateral macro-economic shocks (exporter-importer-time FE)

Table 1. Effect of standard harmonization event on trade flows with Hummels and Klenow (2005) decomposition.

	(1) Total	(2) Ext. margin	(3) Int. margin	(4) Price	(5) Quantity
Harm.	0.00500**	-0.00071	0.00572***	-0.00101	0.00673***
	[0.018]	[0.365]	[0.006]	[0.430]	[0.007]
Observations	5093092	5093092	5093092	5093092	5093092
R^2	0.86	0.68	0.84	0.58	0.80
Adjusted R^2	0.82	0.58	0.79	0.45	0.74

Notes: In brackets: p-values.

Results

Empirical results show that harmonization is beneficial to trade flows:

- A harmonization event increase in trade flows by 0.5%
  - Equivalent to a decrease of tariffs by 1.1 pp (from an initial level of 10%)
- Intensity of harmonization matters
  - 12% increase in trade flow after 10 harmonization events
- Effects are driven by the intensive margin
  - Incumbents sell more quantity (no effect on prices)
  - No effects on the extensive margin (no changes in net entry)

Figure 2: Event study

(Compare growth rate of trade flows in treatment group vs. control group)

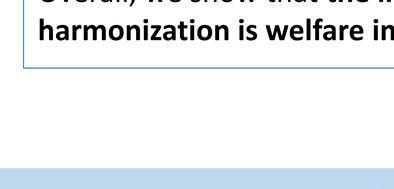


Figure 3: Extensive margin

(Change in the number of 6-digit HS products)

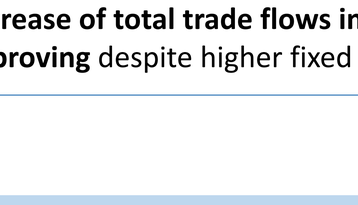
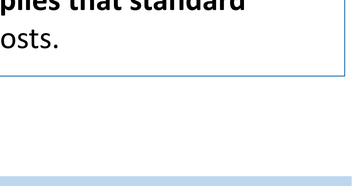


Figure 4: Intensive margin

(Change in the average sales per 6-digit HS products)



Discussion

Theoretical model points to important dynamic interplay between fixed and variable costs.

- **The increase in the intensive margin** after a harmonization event **suggests a reduction in variable costs.**
- **The absence of changes in the extensive margin point to a simultaneous increase in fixed costs** that offsets the reduction in variable costs.

Taken together, the results suggest that incumbents benefit from harmonization events because their variable costs decrease. At the same time, harmonization does not increase competition for incumbents because of higher fixed cost to export for potential entrants.

Overall, we show that **the increase of total trade flows implies that standard harmonization is welfare improving** despite higher fixed costs.

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