Trade, Development, and the Political Economy of Public Standards

Johan F.M. Swinnen and Thijs Vandemoortele

LICOS Centre for Institutions and Economic Performance

University of Leuven (KUL), Belgium
• Proliferation of public standards
  – Globally
  – Variety of areas
  – On product and production process
  – Variety of nutrition, health, environmental, social concerns
• **Economists:**
  – Standards as political economy response to constraints of international trade agreements (protection in disguise, Baldwin 2001; OECD 2001; Sturm 2006)

• **Examples:**
  – Fischer and Serra (2000): standards biased against imports
  – Bredahl et al. (1987): USA’s larger minimum size requirements for imported tomatoes
  – Anderson et al. (2004): GM standards to protect against imports
  – Fulton and Giannakas (2004): GM labeling when low return on GM food
  – Otsuki et al. (2001): infamous aflatoxin case (saving 2 in a billion)
  – Krueger (1996): international labor standards as protectionism
• However:
  – Many quality standards introduced following demands by consumers → protectionist?
  – Standards not necessarily protectionist in effect (Tian 2003, Marette and Beghin 2007)
  – Vertical differentiation literature:
    • Leland (1979): ambiguous welfare effects of minimum quality standards
    • Ronnen (1991): welfare increases (Bertrand competition)
    • Valletti (2000): welfare decreases (Cournot competition)
    • All find positive effects on consumer surplus
Overview

• The Model
  • The political equilibrium

• Development and Standards
  • Positive correlation

• Trade and Standards
  • Protectionist measures?
The Model: Consumers

- Heterogeneous preferences, unit consumption
- Standard guarantees quality/safety
- Individual indirect utility function (Tirole 1988):
  \[ u_i = \begin{cases} 
  \phi_i (\varepsilon + s) - p & \text{if he buys the good with standard } s \text{ at price } p \\
  0 & \text{if he does not buy} 
  \end{cases} \]
- Preference parameter \( \phi_i \)
  uniformly distributed on \([\phi-1, \phi]\)
- Uncovered market \( \phi-1 < p/(\varepsilon + s) < \phi \)
- Aggregate demand \( c(p, s) = N(\phi - p/(\varepsilon + s)) \)
The Model: Producers

- **Production side:**
  - Unit cost function \( g = g(q,s) = k(q,s) + t(s) \)
    - Quantity \( q \)
    - Production costs \( k(q,s) \) (more expensive production tech.)
    - Transaction costs \( t(s) \) (control, enforcement costs)
  - Standard increases costs (~ prohibition to use a cheaper technology, e.g. child labor, GM technology)

- **Foreign producers:** \( g^f(q^f,s) = k^f(q^f,s) + t^f(s) \)

- **Small open economy:** producers are price takers

  Subsequently: \( p(s) = g^f(q^f,s) \) and \( \frac{\partial p}{\partial s} = \frac{\partial g^f}{\partial s} \)
• Both consumers and producers may gain or lose from the standard.

\[
\frac{\partial \Pi_p}{\partial s} = q \cdot \left( \frac{\partial p}{\partial s} - \frac{\partial g}{\partial s} \right)
\]

\[
\frac{\partial \Pi_c}{\partial s} = \frac{N}{2} \left( \phi^2 - \left( \frac{p}{\varepsilon + s} \right)^2 \right) - \frac{\partial p}{\partial s} c(p, s)
\]
The Political Model

• Truthful contribution schemes
  (Grossman and Helpman 1994)

  • Producers \( C_p(s) = \max \{0; \Pi_p(s) - b_p\} \)
  • Consumers \( C_c(s) = \max \{0; \Pi_c(s) - b_c\} \)

• Government’s objective function

\[
V(s) = \alpha_p C_p(s) + \alpha_c C_c(s) + W(s)
\]

with \( W(s) \equiv \Pi_p(s) + \Pi_c(s) \)
Political Equilibrium

The politically optimal standard, $s^*$, is therefore determined by the following first order condition subject to $s^* \geq 0$:

$$(1+\alpha_p) \left[q^* \left( \frac{\partial p}{\partial s} - \frac{\partial g}{\partial s} \right) \right] + (1+\alpha_c) \left[ \frac{N}{2} \left( \phi^2 - \left( \frac{p^*}{\varepsilon + s^*} \right)^2 \right) - c^* \frac{\partial p}{\partial s} \right] = 0$$

Otherwise $s^* = 0$
Implications

• Political weights: \( \frac{\partial s^*}{\partial \alpha_j} > 0 \) if \( \frac{\partial \Pi_j}{\partial s} > 0 \) at \( s^* \)

• Consumer preferences \( \frac{\partial s^*}{\partial \phi} > 0 \)

• Marginal unit costs (domestic) \( \frac{\partial g}{\partial s} \)

• Marginal unit costs (foreign) \( \frac{\partial g^f}{\partial s} = \frac{\partial p}{\partial s} \)
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• $I$ country’s per capita income
• $z$ indicator of quality of institutions ($\frac{\partial z}{\partial I} > 0$)

\[
\frac{\partial s^*}{\partial I} = \frac{\partial s^*}{\partial \phi} \frac{\partial \phi}{\partial I} + \left( \frac{\partial s^*}{\partial t_s} \frac{\partial t_s}{\partial z} + \frac{\partial s^*}{\partial k_s} \frac{\partial k_s}{\partial z} \right) \frac{\partial z}{\partial I}
\]

– Consumer preferences lower
– Transaction costs higher
– Production costs higher
• Therefore:
  – Shift from low to high standards with increases in development
  – In extreme cases:
    • Pro-standard coalition in rich countries
    • Anti-standard coalition in poor countries
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Trade & Standards

• Key factors
• Impact on trade
• Over- or under-standardization
• (producer-)protectionist measures?
Key factors

1. Relative levels of consumption and domestic production → trade

2. Standards may affect the comparative cost advantage in production

\[
\frac{\partial \Pi_p}{\partial s} = q^* \left[ \left( \frac{\partial k^f}{\partial s} - \frac{\partial k}{\partial s} \right) + \left( \frac{\partial t^f}{\partial s} - \frac{\partial t}{\partial s} \right) \right]
\]

a) Through production costs: (dis-)economies of scale or not
b) Through transaction costs
Standards as barriers or catalysts to trade?

- \( D \): inverse demand function
- \( A \): inverse supply function

\[
\frac{\partial m}{\partial s} = \frac{D_s}{|D_c|} + \frac{A_s}{A_q} - \left( \frac{A_q + |D_c|}{A_q|D_c|} \right) \frac{\partial p}{\partial s}
\]

- Sign undetermined
- No direct interpretation for protectionism
Over- and Under-standardization

- As in classical trade theory: compare political $s^*$ to social optimum $s^\#$
- $s^\#$ determined by

$$\left[ q^\# \frac{\partial p}{\partial s} - \frac{\partial g}{\partial s} \right] + \left[ \frac{N}{2} \left( \phi^2 - \left( \frac{p^\#}{\varepsilon + s^\#} \right)^2 \right) - c^\# \frac{\partial p}{\partial s} \right] = 0$$

- $s^\# = s^*$ only if
  - $\alpha_p = \alpha_c$
  - or $\frac{\partial \Pi_p}{\partial s} = \frac{\partial \Pi_c}{\partial s} = 0$ at $s^\#$
<table>
<thead>
<tr>
<th>( \alpha_p &gt; \alpha_c )</th>
<th>( \frac{\partial \Pi_p}{\partial s} &gt; 0 )</th>
<th>over-standardization ( (s^* &gt; s^#) )</th>
<th>( \frac{\partial \Pi_p}{\partial s} &lt; 0 )</th>
<th>under-standardization ( (s^* &lt; s^#) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protectionist</td>
<td>Protectionist if ( s^# &gt; 0 )</td>
<td></td>
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</tbody>
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\[ \alpha_c > \alpha_p \]

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</table>
Thank you for your attention

Questions?
Possible extension: biased perceptions

- $\lambda$ as a measure of the bias in perception of consumers, equal to 1 if consumers’ perceptions of the standard’s effects are unbiased.

- Consumer utility function becomes:

$$u_i = \begin{cases} 
\phi_i (\varepsilon + \lambda s) - p & \text{if he buys the good with standard } s \text{ at price } p \\
0 & \text{if he does not buy}
\end{cases}$$

- $\frac{\partial s^*}{\partial \lambda} > 0$
• Perceptions: function of consumer trust in government regulators, media coverage, etc.
• Eg:
  – Different organization & structure of media
    • More commercial media in IC: more negative towards GM
    • More government control in DC: more positive towards GM
  – Rural/urban population structure