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Trade, Development, and the Political Economy of Public Standards

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- 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 competetion)
    - 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 ϕ_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 $g = \mathrm{g}(q,s) = \mathrm{k}(q,s) + \mathrm{t}(s)$
    - 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: $\mathrm{g}^f\left(q^f,s\right) = \mathrm{k}^f\left(q^f,s\right) + \mathrm{t}^f\left(s\right)$
- Small open economy: producers are price takers
  Subsequently: $\mathrm{p}(s) = \mathrm{g}^f\left(q^f,s\right)$ and $\frac{\partial p}{\partial s} = \frac{\partial g^f}{\partial s}$

- Both consumers and producers may gain or loose from the standard.

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

$$\frac{\partial \Pi_c}{\partial s} = \frac{N}{2} \left(\phi^2 - \left(\frac{p}{\varepsilon + s} \right)^2 \right) - \frac{\partial p}{\partial s} \mathrm{c}(p, s)$$

The Political Model

- Truthful contribution schemes
  (Grossman and Helpman 1994)
  - Producers $\mathrm{C_p}(s) = \max\{0; \Pi_p(s) - b_p\}$
  - Consumers $\mathrm{C_c}(s) = \max\{0; \Pi_c(s) - b_c\}$

- Government's objective function

$$\mathrm{V}(s) = \alpha_p \mathrm{C_p}(s) + \alpha_c \mathrm{C_c}(s) + \mathrm{W}(s)$$

with $\mathrm{W}(s) \equiv \Pi_p(s) + \Pi_c(s)$

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: $\frac{\partial s^*}{\partial \alpha_j} > 0 \text{ if } \frac{\partial \Pi_j}{\partial s} > 0 \text{ at } s^*$
- 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 $\left(\frac{\partial z}{\partial I} > 0\right)$

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

  - 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 $s^{\#}$

$\alpha_p > \alpha_c$	
$\frac{\partial \Pi_p}{\partial s} > 0$ over-standardization $\left(s^* > s^{\#}\right)$	$\frac{\partial \Pi_p}{\partial s} < 0$ under-standardization $\left(s^* < s^{\#}\right)$
Protectionist	Protectionist if $s^{\#} > 0$

$\alpha_c > \alpha_p$	
$\frac{\partial \Pi_c}{\partial s} > 0$ over-standardization $\left(s^* > s^{\#}\right)$	$\frac{\partial \Pi_c}{\partial s} < 0$ under-standardization $\left(s^* < s^{\#}\right)$
Not protectionist	Not protectionist

Thank you for your attention

Questions?

Possible extension: biased perceptions

- λ 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