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The Political Economy of Nutrition and Health Standards in Food Markets

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Abstract— This paper presents a general political economy model of standards. We use the model to derive political and social optima of nutrition and health standards in food markets, and to identify under which cases “under-standardization” or “over-standardization” will result. The paper analyses the impact of trade and development on the political equilibrium as well as the role of the media and consumer perceptions.

Keywords— Political Economy, Standards, Food Markets

I. INTRODUCTION

Nutrition and health standards are increasingly important in global food markets (Fulponi 2006). There are several reasons for this. A variety of consumer concerns, including not only nutrition and health problems but also related to environmental and social issues, have led to new or increased standards. New technologies allow improved monitoring, but also lead to new standards. Globalization also affects standards across the globe. On the one hand, the fear of imports of contaminated foods has increased protectionist tendencies as well as tightened food standards (Unnevehr 2000). On the other hand, trade integration and foreign investments contribute to the global spread of standards (Reardon and Berdegué 2002; Maertens and Swinnen 2007).

While these developments occur globally, there is a wide variety in standards across countries, and in particular between developing (“poor”) and developed (“rich”) countries (Henson 2004). One explanation is that this is socially efficient as these differences reflect differences in preferences of populations which vary with economic development and incomes, as well as with geography and culture. However, several studies argue that many standards that we observe in reality are not socially optimal (Bockstael 1984, Fischer and Serra 2000).¹ The literature provides different reasons why actual standards may differ from those that would be socially optimal. One line of argument is that, as trade agreements restrict tariff barriers, standards are increasingly used as non-tariff barriers to trade (Baldwin 2000; OECD 2001). For example, Anderson et al.

(2004) and Fulton and Giannakas (2004) argue that genetically modified (GM) food standards are used as protection against imports. A second argument states that standards are suboptimal because they are part of a “race to the bottom”, for example to attract foreign investors (Wellisch 1995; Kuncze and Shogren 2005), or a “race to the top” (see Jaffe et al. 1995). In summary, while these studies suggest different reasons why, they agree that standards are often set at suboptimal levels. However, none of these studies has analyzed why standards are affected by country characteristics, such as by levels of development.

To understand why governments set standards at suboptimal levels, and why these choices are affected by country characteristics we draw on the political economy literature. More specifically, in this paper we develop a general political economy model of standard setting and we use the model to derive politically optimal standards. We also analyze how the political equilibrium compares with the social optimum. In fact, by comparing both optima we identify under which cases “under-standardization” or “over-standardization” will result. We then analyze how various factors affect this political equilibrium.

II. THE MODEL²

A key issue is obviously how to model standards. The approaches in the literature differ importantly. Some (such as Bockstael 1984) assume that consumers can costlessly observe product characteristics *ex ante*, while others (such as Leland 1979) assume that consumers are *ex ante* uncertain about the characteristics of the product. In the latter case standards can improve upon the unregulated market equilibrium by reducing the asymmetric information between consumers and producers. Yet other studies (such as Copeland and Taylor 1995; Fischer and Serra 2000; Anderson et al. 2004; Besley and Ghatak 2007) model the effect of standards as their impact on consumption externalities. This could relate to, for example, minimum standards on catalytic converters in cars or GM foods. Most studies consider that the introduction of standards implies compliance costs for producers, and this holds both for

1. In a very interesting survey and discussion, Gardner (2003) reviews costs and benefits of standards in food markets and comes to more nuanced conclusions.

2. For a more elaborate version of the model, including formal derivations and proofs of the key results, we refer to Swinnen and Vandemoortele (2008).

domestic producers and those in countries (interested in) exporting to the country that imposes the standard (Henson and Jaffee 2007; Suwa-Eisenmann and Verdier 2002).

Consider therefore a small open economy with one import competing sector, and one numéraire good (good 0). There are n individuals in the economy who all have identical tastes, represented by a quasi-linear utility function

$$U = c_0 + u(c(p, \lambda s)) \quad (1)$$

where c_0 is consumption of the numéraire good, c is consumption and p the price of the good produced in the import-competing sector. s is the standard imposed in the import-competing sector. λ is a variable which measures the bias in perception of the consumer. λ is equal to 1 if the consumer's perceptions of the standard's effects are unbiased. A higher s refers to a more stringent standard. A standard which guarantees certain quality/safety features of the product induces to consume more of the product, ceteris paribus. For example consumers who perceive health problems with certain (potential) ingredients or production processes may increase consumption if they are guaranteed the absence of these elements. We call this the "consumption effect".

We also include an "externality effect" of standards, which we denote by $\gamma(c)$. The externality may be positive or negative (Anderson et al. 2004), and is increasing in consumption. An example of such externality effect is a standard that prohibits the use of child labour in food production. Some standards may have both consumption and externality effects. For example organic food standards may induce increased consumption when consumers consider the product as healthier or more tasteful. However, society may, in addition, benefit from reduced pesticide use.

At the production side, we assume that the numéraire good is produced with labour alone (l_0); that the sector has constant returns to scale and an input-output ratio of 1. Production in the other sector is a function $q = f(l, k)$ of the production factor labour l and of a sector-specific input factor k that is inelastic. All profits made in the sector accrue to the specific-capital owners. The cost function $g = g(q, s, w)$ depends on the standard: higher standards increase production costs ($\partial g / \partial s > 0$).

In a small open economy, domestic firms are price takers and domestic prices equal world prices. To start, we assume that when the country imposes a standard, the production costs of the imported goods also rise as the standard is also imposed for imported goods – and is equally enforced.

A. The Social Optimum

Total welfare W equals the sum of all n individual utilities plus the externality effect:

$$W = nU + \gamma(c) = n(c_0 + u(c)) + \gamma(c). \quad (2)$$

This can be written as

$$W = \Pi_p + w(l + l_0) + n(u(c) - pc) + \gamma(c) \quad (3)$$

where Π_p is the profit of producers and $w(l + l_0)$ is the constant labour income of consumers. Assuming that $\lambda = 1^3$, the social optimum standard $s^\#$ is determined by:

$$\begin{aligned} & \frac{\partial p}{\partial s} \left[q + \frac{\partial q}{\partial p} \left(p - \frac{\partial g}{\partial q} \right) \right] - \frac{\partial g}{\partial s} \\ & + n \left[\frac{\partial p}{\partial s} \left[\frac{\partial c}{\partial p} \left(\frac{\partial u}{\partial c} - p \right) - c \right] + \frac{\partial c}{\partial s} \left(\frac{\partial u}{\partial c} - p \right) \right] \\ & + \frac{\partial \gamma}{\partial c} \left(\frac{\partial c}{\partial s} + \frac{\partial c}{\partial p} \frac{\partial p}{\partial s} \right) = 0. \end{aligned} \quad (4)$$

The first two terms in equation (4) capture the impact on producers. They will loose from higher standards when the increase in costs $\partial g / \partial s$ is larger than the price effect $\partial p / \partial s [q + \partial q / \partial p (p - \partial g / \partial q)]$. This effect may be positive or negative, depending on the trade position and the relative size of the effects⁴. The effect of higher standards on consumer surplus is also uncertain. Consumer surplus of the representative consumer will increase if the marginal "consumption effect" $\partial c / \partial s (\partial u / \partial c - p)$ is larger than the "price effect" $\partial p / \partial s [\partial c / \partial p (\partial u / \partial c - p) - c]$. The last term in equation (4) captures the externality effect.

B. The Political Optimum

Consider then a government that maximizes its own objective function which, following the approach of Grossman and Helpman (1994), consists of a weighted average of contributions from lobbies and social welfare. We assume that all sectors and consumers are politically organized and that they lobby simultaneously. We assume that standards do not affect producers of the numéraire good. The "truthful"⁵ contribution scheme of the specific-capital owners is equal to the function $C_p(s) = \max\{0; \Pi_p - b_p\}$, in which the constant b_p shows how much of the profits the producers want to keep i.e. not contribute to the government. Similarly, the "truthful" contribution scheme of a representative active consumer will be of the form $C_c(s)$

3. $\lambda = 1$ in the social optimum because we assume that the social planner knows the actual effects on consumers.

4. See Swinnen and Vandemoortele (2008) for illustrations of various cases.

5. The common-agency literature (e.g. Bernheim and Whinston 1986) states that outcomes are truthful, which implies in our political economy model that lobbying groups will set their lobbying intensity in accordance with their expected gain from a standard.

= $\max\{0; \Pi_c - b_c\}$, with $\Pi_c = U + w(I+I_0)/n - pc$ the aggregate consumer surplus for a consumer. Total contributions of consumers amount to $nC_c(s)$. The government maximizes a weighted average of contributions of producers (weighted by α_p) and consumers (weighted by α_c) and social welfare:

$$V(s) = \alpha_p C_p(s) + \alpha_c C_c(s) + W. \quad (5)$$

The politically optimal standard, s^* , is determined by:

$$\begin{aligned} (1 + \alpha_p) \left[\frac{\partial p}{\partial s} \left[q + \frac{\partial q}{\partial p} \left(p - \frac{\partial g}{\partial q} \right) \right] - \frac{\partial g}{\partial s} \right] \\ + (1 + \alpha_c) n \left[\frac{\partial p}{\partial s} \left[\frac{\partial c}{\partial p} \left(\frac{\partial u}{\partial c} - p \right) - c \right] + \frac{\partial c}{\partial s} \left(\frac{\partial u}{\partial c} - p \right) \right] \quad (6) \\ + \frac{\partial \gamma}{\partial c} \left(\frac{\partial c}{\partial s} + \frac{\partial c}{\partial p} \frac{\partial p}{\partial s} \right) = 0. \end{aligned}$$

C. Over- and Under-Standardization in Public Standard Setting

It is clear from conditions (4) and (6) that the politically optimal s^* will only equal the social optimum, $s^\#$, when $\alpha_p = \alpha_c$, $\lambda = 1$ and $\gamma = 0$. However, if one of these conditions is not fulfilled, $s^* \neq s^\#$.

Consider the case where $\alpha_p = \alpha_c$ and $\gamma = 0$. The political optimum will then differ from the social optimum when the perception variable λ is not equal to one. In case consumers perceive the standard to be lower than the actual standard ($\lambda < 1$) consumer contributions will be lower, leading to: $s^* < s^\#$. We refer to this case as “under-standardization”. If consumers have upward bias in perceptions, “over-standardization” results ($s^* > s^\#$).

Next, if consumers have stronger political weights than producers ($\alpha_c > \alpha_p$) and the consumption effect is larger than the price effect then overstandardization will result. A relatively higher price effect will result in understandardization. Similarly, when $\alpha_p > \alpha_c$ and the implementation cost is higher than the price effect, lower producer contributions will lead to understandardization. Finally, if $\gamma \neq 0$, then the externality effect will be weighted less in the political optimum than in the social optimum which will lead to under- or over-standardization, depending on whether the externality effect is negative or positive for society.

III. THE ROLE OF TRADE

Trade affects the politically optimal standards in (at least) four ways. First, trade will affect the net impact of standards on producers and consumers as reflected in equations (4)

and (6) and hence their political contributions. For a given level of consumption, with relatively large imports and less domestic production, the producer effects will be smaller and hence producer contributions lower. Vice versa, for a given level of domestic production more imports and higher consumption levels imply that the effects on consumers will be larger and therefore consumer contributions higher.

Second, standards may affect the comparative cost advantage in production between domestic and foreign producers. This is the argument used by Anderson et al. (2004) to argue why EU producers lobby against GMOs: they argue GMO technology would reinforce the cost advantage of producers in countries such as the US and Brazil and therefore it would be rational for EU producers to support (rather than oppose) cost increasing standards to ban GMOs. This argument makes assumptions on the nature of the supply functions and the technology which may not hold in general. Standards will increase production cost advantages when they reinforce scale economies but not when they are scale neutral or when they have scale diseconomies. This would induce different reactions from domestic producers.

Third, standards may also affect comparative advantage through implementation costs of standards. A country's comparative advantage in production costs and in implementation costs may be quite different. Countries with high production costs (importers) may be more efficient in implementing standards. In such cases, standards will give an advantage to domestic producers over foreign producers and will increase contributions in favour of the standard.

Fourth, enforcement of standards may be different between domestically produced and imported goods. If the country has enforcement problems in its domestic market (for example if producers are dispersed) domestic producers benefit from a higher price without the costs of compliance. This would increase producer contributions of the sector in favour of a standard. However consumer contributions will be lower because they benefit less from poorly enforced standards. The reverse scenario is also possible when the domestic sector adheres by the standard while enforcement on imports is problematic. Contributions of producers would be aimed against the standard because they bear all the costs but fewer benefits.

All these elements discussed here affect the political optimum standard s^* . However, notice that they will also affect the social optimum $s^\#$. Hence these factors may reinforce or weaken over- or understandardization.

IV. CONSUMER PERCEPTIONS, DEVELOPMENT AND THE MEDIA

From equation (6) it follows that perceptions of consumers are an important factor in the political economy of standards. Studies find that consumer perceptions are functions of the level of consumer trust in government regulators, attitudes toward scientific discovery, and media coverage (Kalaitzandonakes et al. 2004).

Consumer perceptions (and attitudes) may also represent rational reactions to differences in costs/benefits. The public is most negative towards GM foods in most of the developed countries, especially in the European Union and Japan (with the US an exception). In poorer countries consumer attitudes toward GM foods are less negative and in many cases positive (see Curtis et al. 2008 for a review). Consumers in rich countries have less to gain from GM induced farm productivity improvements compared to developing country consumers who have much to gain from cheaper food. This argument is also consistent with empirical observations that EU consumers have generally more favourable attitudes towards other applications of biotechnology, such as medical applications which have more (potential) benefits for richer consumers.

Information flows also play a role. A study by McCluskey et al. (2003) finds that people associated with agriculture or consumers living in rural areas are more in favour of GM crops than urban consumers⁶. It is likely that consumers associated with agriculture have a better idea of pesticides used on non-GM crops than urban consumers; and hence of the benefits from GM (such as pesticide resistant crops). As developing countries have a higher proportion of rural residents, this may contribute to explain the differences in perceived benefits and, thus, standards.

Another reason for the differences across countries is the different organization and structure of the media in rich and poor countries. Mass media is the main source of information for consumers to form attitudes regarding many issues, including food (Frewer et al. 1998). Commercial media is more likely to highlight potential risks associated with biotechnology in its reporting (McCluskey and Swinnen 2004). The increased cost of media information in developing countries leads to lower media consumption and to a proportionately stronger reduction in negative stories. In addition, government control of the media is stronger in poor countries. This may lead to a more positive coverage of biotechnology (Curtis et al. 2008). The combination of these factors may contribute to more favourable perceptions of GM technology among consumers in these countries.

6. Unpublished research of Scott Rozelle and Jikun Huang confirms this result for China.

V. DEVELOPMENT AND THE POLITICAL ECONOMY OF STANDARDS

Our analysis suggests several reasons for the wide variety in standards across the world, and in particular between developing (“poor”) and developed (“rich”) countries.

The most obvious factor is that lower income levels imply relatively lower consumer preferences for nutrition and health standards, and stronger consumer preferences for lower food prices. This is also consistent with international survey evidence on consumer preferences for GM standards, as summarized above. These differential consumer preferences for standards are reflected in differences for the marginal values of $\partial c/\partial s$ and of $\partial c/\partial p$ in equations (4) and (6). As a consequence, consumer contributions in favour of standards will be lower in poor than in rich countries and this leads to a lower politically optimal standard level, *ceteris paribus*.

Another factor is the enforcement of standards, which is likely to vary among countries. Studies find that the quality of institutions (including institutions for enforcement of contracts and public regulations) is positively correlated with development. Consumer contributions in favour of standards will be lower with poor enforcement, and therefore is less strong in poor countries because of this factor.

Related to this, while poor countries with low wages and relatively less urban pressure on land use may have a cost advantage in the production of raw materials in agriculture and food markets, producers in rich countries may have lower implementation costs. Lower implementation costs could result from better higher education and skills of producers, better public infrastructure, easier access to finance, etc.

As we explained above, the media structure and information provision is likely to induce a more pro-standard attitude of consumers in rich countries than in poor, as increased access to media will increase attention to risks and negative implications of low standards.

In combination these factors will shift the political equilibrium from low standards to high standards with increases in development. In the extreme cases, the variations in the mechanisms identified here may result in a pro-standard coalition of consumers and producers in rich countries (where producers may also support standards as they enhance their competitive position against imports) and an anti-standard coalition in poor countries (where consumers may oppose standards as they are less aware of possible health and nutrition problems, as the enforcement may be ineffective, and as they are more concerned with low food prices than food standards).

Finally, the fact that the political optimal level of standards increases with development does not necessarily imply that this also leads to an increasing level of “over-standardization”. With development, not just the political optimum level of standards changes, but also the socially optimal level of standards. It is clear from equation (4) and the discussion above that income and enforcement affect both optima.

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