HARMONIZING STANDARDS AS INSTITUTIONS

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Integration efforts of the Central and Eastern European (CEE) countries are gradually materializing. Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia, and in addition to Cyprus and Malta, are to join the EU on May 1 2004 after the Accession Treaty is ratified[2]. Although substantial political enthusiasm is apparent in every accession country, less optimistic opinions are also voiced. One of the first short- and medium-term priorities in each country was to establish and consolidate standardization and conformity assessment structures. While the concept of "deeper integration beyond abolition of import tariffs and quotas, to further measures to remove market segmentation and promote integration" (Venables 2000) is by and large not questioned, critical views on potential losses of national standards harming national identity – i.e., what constitutes "rum", and how to address cheeses made from non-pasteurized sheep milk – are seen as well.

The issue of "lost national standards" is repeated: in 1987 the EU (then European Community) published its visionary plan on new, standardized Europe of 1992; a gain of 7 per cent of European income was estimated from harmonization (Emerson 1988, p.6). Even then British were opposed to some parts of it, claiming "brilliant green mushy peas" and "pink sausages" are part of their national identity, and eventually succeeded in getting the necessary exemptions (Krugman and Obstfeld 2002). Although the harmonization issue has been on the tables in Brussels at least since the late 1980s, it yet has to be concluded. Over the years "new" approach replaced the "old" one: instead of imposing technical solutions, the EU legislation is limited to establishing the essential requirements which products must meet (EC 2003).

Differences in quality standards are protected by World Trade Organization's (WTO) recognition of countries' right to adopt the standards they consider appropriate – i.e., for human, animal or plant life or health, for the protection of the environment or to meet other consumer interests assuming their use is justified and they are not used as barriers to trade (WTO 2003). Although countries are urged to apply international food standards (when existing), suggestions of Codex Alimentarius[3] (or any other bodies) are not binding. The result is a variety of standards and technical regulations across the world and consequent welfare losses. Reaching out for an example from outside Europe, tolerance levels for

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[2]http://europa.eu.int/comm/enlargement/enlargement.htm

[3]Codex Alimentarius is the compilation of all the Standards, Codes of Practice, Guidelines and Recommendations of the Codex Alimentarius Commission – the highest international body on food standards, a subsidiary body of the FAO and the WHO. In addition to Codex, standardization work is also performed by UNECE and OECD. On their mutual relationship, see for example http://www.fao.org/docrep/meeting/005/y1132e/y1132e04.htm#fn3.

tetracycline in beef vary from 0.1 parts per million (ppm) in the EU and New Zealand, through roughly 0.2 ppm in Japan, Canada and Australia to 2.0 ppm in the United States. The level recommended by Codex Alimentarius is 0.6 ppm. Wilson et al (2002) estimate harmonization at the Codex standard would increase bovine meat trade by $3.2 billion (or a 57%), and that the trade value at Codex standard is $5.1 billion higher than the trade value under the most stringent standard (0.1 ppm).

So why do standards tend to be so sensitive question? Standards clearly are part of the institutional heritage in the North's sense. Institutions, as defined by North, "are the rules of the game in a society or, more formally, are the humanly devised constraints that shape human interaction" (North 1990). They encompass standards and regulations, both regarding products and processes, and are designed, among other intentions, to lower transaction costs and ease interactions among agents. North's institutions are rarely imposed on scientific grounds, as suggested by the WTO, but often for historical reasons (or errors). As such, they also tend to be high-exclusion cost goods: meaning it is costly to exclude non-contributors from their utilization, especially when standards are imposed as public goods. On the other hand, smaller, less-than-global (LTG) groupings allow standards to be imposed on the level different from the world standard as club goods, and exclude non-members from using them.

Some specific examples of standards imposed by a country could be food safety, for example the application of and compliance with the HACCP (Hazard Analysis Critical Control Point) food quality control system. However, our framework can be easily extended to account for any regulation – i.e., genetically modified (GM) organisms and foodstuffs, environmental ("dirty vs. clean production") and labor laws, etc.

This paper unites two prominent issues: national differences in standards and integration efforts of the CEE countries into the EU. Specifically, it develops and solves a model of endogenous standards setting and an arrangement formation, including its potential enlargement. The driving forces in the model are differences in quality preferences across countries, and Krugman-like economies of scale in producing a single quality of each good. Trade arrangements emerge from countries with similar quality preferences endogenously agreeing to capture economies of scale in production.

In addition to a neoclassical modeling, we also bring in institutional aspects of accession: institution of standard and institution of economic (or political) agreement. A decision to enter an agreement from the side of an accession country requires an assessment of the institution of standard, and consequently a choice whether to become a "complete" member, or obtain an exception, and produce good only for domestic market without utilizing economies of scale and serving larger – albeit more demanding market.

Unlike previously published research regarding standards setting (i.e., Casella 2001), we model the production side rather than relying on the endowed exchange economy. Adding an institutional reflection refreshes the neoclassical approach and augments political considerations. Our paper is tailored at accession of CEE countries to the EU; however, its framework could be applied to any political or trading bloc considering accession of new members, and/or deeper integration.

Paper first introduces institutional background and literature review behind LTG agreements and standards. Model description and policy alternatives follow. Brief discussion on implications derived from the model concludes the paper. Some of the technical details, omitted from the main discussion, are clarified in the Appendix A.

1. INSTITUTIONAL BACKGROUND

Institutional background briefly touches upon four main points:

1. Existence of LTG agreements in the WTO framework;
2. Countries' rights to adopt national standards;
3. Approaches to standardization in the EU; and
4. Standards in global, LTG, and national contexts.

1.1 LTG Agreements and the WTO

The EU – by limiting its membership to countries fulfilling certain criteria – is undoubtedly a LTG organization operating in the excludable club mode limited provision of goods to members only. Its membership is limited to countries fulfilling the "Copenhagen criteria": prospective member must be a stable democracy, respecting human rights and protecting minorities, have a functioning market economy, and adopt the common rules, standards, and policies that make up the body of the EU law (EC 2003).

Despite the fact LTG agreements in principle violate the Paragraph 1 of the GATT 1947, Part I, the Article I on the General Most-Favored-Nation (MFN) Treatment guaranteeing that "any advantage, favor, privilege or immunity granted by any contracting party to any product originating in or destined for any other country shall be accorded immediately and unconditionally to the like product originating in or destined for the territories of all other contracting parties," the GATT also allows formation of LTG agreements assuming that if such an area is created, duties and other trade barriers should be reduced on substantially all sectors of trade in the group, and non-members should not find trade with the group any more restrictive than before the group was set up (WTO 2002)[4].

Among the advantages of a membership in a trade (or even deeper) agreement – on our case sought by the CEE countries – are possible enhancement of terms of trade for an accord as a whole; a trade creation effect; economies of scale; the offset of eventual domestic monopoly power; increased levels of investments and technology transfers followed by industrialization, development, and increased rates of growth; increased bargaining power within a region as well as globally; and the means to consolidate domestic economic reforms and provide political stability in transition economies. Positive externalities of membership include raised credibility and sustainability of reforms in the case of a small country being in a regional integration arrangement with a large developed country, and improved security for member countries in form of a reduced tension among enemies (Schiff et al. 1997).

[4]Rules for forming clubs among countries as individual political objects are described above. However, forming agreements among profit maximizing firms resulting in cartels are prohibited in most countries in the world.

The disadvantages of LTGs affect both members and outsiders. The shortcomings include prospective trade diversion effects; losses in tariff revenue following removal of trade barriers; necessary investment of resources needed to negotiate and implement an agreement; often confusing rules of origin and additional issues of technical, administrative, and political nature arising from memberships in several overlapping treaties. Countries outside an agreement are likely to experience consequences of trade diversion due both to higher price and rules of origin. With respect to global arrangements, multilateral negotiations could be incapacitated by scarce negotiating resources being exhausted at the plurilateral level, as well as potential tensions among the agreements.

1.2 Standards

Definition and Classification

In trade law a standard is a document approved by a recognized body (either government or non-governmental[5]), that provides for common and repeated use, rules, guidelines or characteristics for products or related processes and production methods, with which compliance is not mandatory (Bhalla and Kennedy 1998). A technical regulation – usually government imposed – is a document which lays down product characteristics or their related production processes; the compliance is mandatory (ditto). Following the literature, we use the term "standard" to include both types of documents.

Wilson (2001) categorizes standards by function into product and process standards. Product standards refer to characteristics that goods should possess – for example, minimum nutrition content, maximum pesticide residue on agricultural products, etc. Process standards (often labeled as Production Processes Methods – PPMs) refer to conditions under which products are manufactured, packaged, or refined (i.e., meat radiation, hormone treatment, tomato ripening, etc.). Process standards may be targeted at production conditions that are not directly related to the final good (Wilson 2001). Examples of process standards include, but are not limited to "rainforest-safe bananas", "sweatshop-free textiles", "leg-hold-trap-free fur", or "dolphin-safe tuna". Thus, labor and environmental standards belong to the process standard category as well. Countries are not obligated to choose the same production process method, but PPMs are not allowed to act as an obstacle to trade (recall the US vs. Mexico tuna case). The GATT recognizes the concept of the "like products" based on tariff classification and end use: if products fall into the same tariff classification category and are subject to the same end use, they are to be treated identically, and cannot discriminate on the basis of the production process.

Advantages of Standards

Standards are imposed as a form of domestic policy instrument for a variety of different reasons. Among those the most critical are facilitation of market exchange, smoothing of upstream and downstream interactions among industries, lower transaction costs among agents as a medium of information exchange, utilization of economies of scale, etc.

[5]For example the International Organization for Standardization (ISO): a network of the national standards institutes of 146 countries, on the basis of one member per country, headquartered in Geneva. ISO standards are voluntary, as a non-governmental organization, ISO has no legal authority to enforce their implementation. Most of the ISO standards are technical, i.e., developing methods (http://www.iso.ch).

Problems with Standards

With the progressive elimination of tariff barriers, the debate on international trade policies has shifted to national differences on standards and regulations (Casella 2001). Standards have a potential to be used as a strategic policy instrument to grant special treatment to domestic industries and serve as technical barriers to trade.

Standards Setting within the WTO Framework

When standards differ between countries, they have the potential to seriously impede trade (Sampson 2000). According to the WTO, countries have the right to adopt standards related measures and to establish a level of protection they deem appropriate assuming they refrain from discriminatory treatment in respect to standards-related measures and from creating or using standards-related measures as an *unnecessary* obstacle to trade (emphasis added). Thus, countries are allowed to set and require different standards assuming imported and domestic goods are treated equally. Two main agreements affecting the ability of countries to impose standards are Agreement on Technical Barriers to Trade (TBT) and Agreement on Sanitary and Phytosanitary Measures (SPM).

The TBT Agreement balances the ability of governments and the private sector to implement legitimate standards and the procedures for assessing product conformity with those standards against their unjustified use to protect a domestic industry (Bhalla and Kennedy 1998). It does not cover services, sanitary and phytosanitary measures or governmental purchasing specifications. Neither does it cover regulations and standards on PPMs to the extent they relate to product standards characteristics, but not as they relate to pollution caused by PPMs (ditto). Article 2.1 of the TBT Agreement states that "Members shall ensure that in respect to technical regulations, products imported from the territory of any member shall be accorded treatment no less favorable than that accorded to like products (*i.e., with the same end use and tariff classification*) originating on any other country" (italics added).

The SPS Agreement "allows countries to set their own standards assuming they are based on science to the extent necessary to protect human, animal or plant health and not arbitrarily or unjustifiably discriminate between countries where identical or similar conditions prevail" (WTO 2003). Intense disagreements exist on what are the appropriate standards to apply for the protection of health.

Scientific Basis and Precautionary Principle

An important question of managing risks - defined as a scientific determination of the relationship between cause and effects in situations where adverse effects can occur – to human, animal, and plant life and health is deciding on the acceptable risk levels and the appropriate standards to adopt in risk management. It raises an infamous question of the relationship between risk and precaution. The Precautionary Principle states that where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent the eventual outcome of risk, covering the gap between banning a product or procedure until science has proved it is harmless and not banning it until science has proved that there is a real risk (Sampson 2000). The most politicized case is the debate over GM products: U.S. regulators view them as not substantially different from the conventional variety, while the EU adheres to the

"precautionary principle" and see GM and conventional varieties as differentiated products due to the perceived risks (Nielsen et al. 2002).

Conformity Assessment Procedures

While standards themselves undeniably play an important role in shaping trade relations, later problems are in mutual recognition of similar standards and conformity assessment procedures (CAPs). Articles 5.1.1 and 5.2.1 of the TBT Agreement provide for the MFN treatment on CAPs. Countries – although discouraged from doing so - can choose to deny entry of foreign goods unless their conformity is reassessed (i.e., labeled with consumer information label to fit domestic requirements). Obligation to comply with foreign standards requirements could result in increased cost for foreign producers, and includes all aspects of conformity assessment, including laboratory accreditation and quality system registration. Minimum derogation principle (Article 5.12) states that CAPs "shall not be more strict or be applied more strictly than is necessary to give the importing member adequate confidence that products conform with the applicable technical regulations or standards taking into account the risk non-conformity would create". Similarly, countries are encouraged to recognize practices – which, albeit different – yield the same result, for example in testing for qualitative and quantitative characteristics. For example, the World Wine Trade Group, consisting of Argentina, Australia, Canada, Chile, New Zealand, South Africa, and United States, signed an agreement on mutual acceptance of oenological practices. Naturally, outsiders to this agreement are required to prove their practices. A similar agreement on a bilateral basis was signed between the EU and Australia. Or in 1995 the governments of Australia and New Zealand signed a Treaty establishing a system for the development of joint food standards, following the Australia New Zealand Closer Economic Relations Trade Agreement signed in 1983[6], diverting the cooperation from trade issues to other aspects. However, for the purposes of this paper and actual modeling, issues related to mutual recognition of CAPs will be assumed away, and we well focus on reaching a consensus on standards as such.

1.3 Approaches to Standardization in the EU

> ….The objective is to establish a European policy on quality in cooperation with national and international standardization bodies to enable businesses to manufacture and sell their products throughout the Community with the aid of a system for the mutual recognition of trade marks and manufacturing process….
>
> European Commission: Technical harmonization[7]

The EU recognizes the removal of TBT as a necessary prerequisite of a complete internal market. Rather than establishing definite technical norms and solutions on a case-by-case approach as it was the instance before 1985, the legislation now establishes minimal requirements products must meet. Harmonized European product legislation includes

[6]There are three areas of food standards excluded from the operation of the Australia – New Zealand joint system - the specification of maximum residue limits for agricultural and veterinary chemicals in foods, the specification of food hygiene practices and export requirements relating to third country trade. http://www.fao.org/docrep/meeting/X2809E.htm

[7]http://europa.eu.int/scadplus/leg/en/lvb/l21002.htm

legislation covering conformity assessment bodies, accreditation bodies, standardization, and market surveillance. Regulations continue to be voluntary, manufactures therefore remain free to offer, on the Community market, products meeting other standards or not meeting any, provided that they satisfy the procedures for assessing conformity laid down by the appropriate Directive (EC 2003).

Commission also recognizes potential problems arising from the voluntary nature of its standards: in its 1998 report, the Commission emphasizes that the voluntary and independent nature of standards drafting can only be justified if the system is truly open and transparent and if the standard is supported by all major interested parties and applied in a uniform way throughout the Community. Consequently, European standardization is slower in the areas in which market is not particularly supportive of standardization, for example in case of goods not suited to be transported, and thus are only consumed locally. Standardization process in the EU takes place in several "layers" of national and European standardization bodies mutually cooperating and informing each other of drafts standards and potential amendments. Where technical standards are not harmonized, the principle of mutual recognition of national rules applies (in line with the *Cassis de Dijon* judgment[8]).

1.4 How do Standards Imposed in Various Settings Differ?

Concepts of public and club goods borrowed from public economics provide a well fitting framework for analysis of trade arrangements and standards adopted by each of them. Public goods are defined as those whose benefits simultaneously affect a group of individuals, but cannot be divided among individuals, owing to nonrivalry of benefits and excludability problems. Club goods, on the other hand, are characterized by congestion and excludable benefits (Cornes and Sandler 1996). Clubs as voluntary groups are justified in the literature by pure taste of association (maybe on the historical grounds), cost reduction from scale economies or team production, sharing of public goods, and sharing of public factors (ditto). In many definitions of clubs in the literature a theme of clubs sharing members' characteristics is common across the board. For example, trade arrangements in a globally multilateral organization resemble a public good due to the non-excludability of benefits[9]. LTG agreements exclude the rest of the world; thus free movement of goods and services within them and agreement regulations are closer to a club good in Buchanan's sense than to a non-excludable public good.

Thus, in the framework described in this paper, three levels of standards are likely to occur: global (as examples of public goods), less-than-global (i.e., the EU standards as club goods), and national (a country in the Union keeping some own standard – i.e., getting an exception, and acting like private goods). For the purposes of this paper we abstract from the truly global public-good-type standard, and focus our attention into club (i.e., agreement standards) and private (i.e., national standards).

[8]The *Cassis de Dijon* judgment ensures that "any product lawfully produced and marketed in one Member State must, in principle, be admitted to the market of any other Member State. For more on the Cassis de Dijon, please refer to http://europa.eu.int/comm/internal_market/en/goods/caasiscomm_en.pdf

[9]In a multilateral agreement – "big club" – non-exclusion can be treated as a choice, rather than a necessity.

Acceptance of a club standard creates an out of the ordinary situation. By belonging to a certain club and accepting a club standard, a country could potentially exclude itself from trading with other clubs, or countries using the world recommended standard, such as the Codex Alimentarius, if those are different from the club standard. It is not unusual for a country to belong to more than one preferential trading arrangement. Each trading arrangement is likely to implement own set of institutions regarding standards or CAPs. The above implies that if a country belongs to a number of clubs with different institutions, it can effectively complicate trading relations with other partners. For now we assume away problems of memberships in overlapping clubs, and just consider the case of countries joining a club, would it be new or enlarging an already existing agreement.

2. LITERATURE REVIEW

2.1 Formation of Trade Agreements

Research on trade agreements often assumes their exogenous formation. Whether modeling a new arrangement (e.g., Grossman and Helpman 1995, Richardson 1994, Levy 1997) or modeling extensions of already existing agreements (e.g., Baldwin 1993, Bond and Syropoulos 1996, Yi 1996, Andriamananjara 1999), to our knowledge the idea of linking agreement formation and the evolution of standards has not been entirely pursued.

2.2 Application of Public Economics

Studies using concepts from public economics in an international setting have been mostly concerned with security (Olson and Zeckhauser 1966, Brauer et al. 2000), and lately with environment (e.g., Pimbert 1997, Carraro et al. 1993). Link between agreements and clubs occurs (e.g., Fratianni and Pattison 2001, Keohane and Nye 2001, Kerr 2002 – none of them agrees on the meaning of a "club"), however, literature seems to largely ignore public concepts to explain the trade agreements phenomena.

Fratianni et al (2001) has the most relevance for our paper. They use a simple club theory model to derive optimum amount of cooperation while stressing need for dominant provider, but their paper contains mostly lessons from club theory applied to LTGs. Organizations with large and heterogeneous memberships offer less probability of success in international cooperation than smaller and homogeneous clubs led by a few players, keeping in mind "inter-block" differences and rivalries: i.e., EU, NAFTA, and Asia (Fratianni et al. 2001).

2.3 Standards

Literature on standards – as well as technical regulations – treats them as reflections of domestic policies and preferences (Ederington et al. 2002) most frequently imposed for facilitation of market exchange. With decreasing tariff trade barriers, it is suspected standards are also employed as a form of strategic trade policy (e.g., Dasgupta 2000, Mattoo, 2001). Most of the up to date literature on standards and trade has primarily dealt with process standards, i.e. environmental and labor standards (e.g., Lynch 2000, Griffin 2000, etc); and standards in the context of development (Henson 1999, Donovan et al. 2001, Hufbauer et al.

2002). Not all papers are concerned with standards imposed as means of trade politics; rather, some investigate social dimensions of standards and their impacts on domestic markets.

In the theoretical modeling, Casella (2001) most explicitly recognizes the role of government as establishing general guidelines for standards; however, she also identifies private coalition of firms as developers of the exact specifications. Contrary to usual treatment considering standards being a public good, Casella identifies standards as club goods. The size of national standard-sharing coalitions is determined by the trade-off between economies of scale, a proxy for the advantage of standardization, and desired variety.

The concept of smaller "alliances" and standards also prevails in Gandal and Shy (2001). Instead of harmonization, they focus on government's incentives to recognize foreign standards, and allow a setting in which countries can form standardization unions. The outcome of the game depends on the size of network and conversion costs.

2.4 Standards and Trade Integration

Several motives repeat in the literature. The most frequent ones are labor and environmental standards – lately also intellectual property rights (IPR), often from the NAFTA perspective. For example, Esty (1994) examines the treatment of environmental considerations in the NAFTA, and concludes the NAFTA provides some useful first steps in efforts to make trade and environmental policies mutually supportive. In the same spirit Emerson and Nessman (1995) praise the NAFTA for shaping future regional and international trade negotiations by dealing with both boundary problems and common standards without dictating uniformity of standards or impinging greatly on each nation's sovereign control over matters within its own borders. Ederington (2001) shows that in a repeated game framework, the enforcement of a free trade agreement may require some convergence in environmental standards across countries when trade is driven by differences in such standards. He also demonstrates that it is more efficient to enforce a trade agreement by setting tariffs to partially offset differences in policy standards than to attempt to harmonize standards within environmental side agreements. In the labor arena, Singh (2002) finds the NAFTA labor side agreement had moderate success in bringing labor concerns to the fore and that predicted negative effects of trade liberalization in form of the erosion of labor standards and their harmonization to the lowest common denominator did not materialize. Lai and Qiu (2003) build a multi-sectoral North (i.e., developed) – South (i.e., developing) model to analyze international IPR protection, and show both regions can gain from an agreement that requires the South to harmonize its IPR standards with the North, and the North to liberalize its goods market.

The opponents of trade liberalization often fear standards would degrade to the lowest level. Garbo's international convergence in regulation in case of measurable standards (2002) shows that, even without acceptance of reciprocal minimum standards, a process of iterative adjustment may be triggered by the coexistence of foreign goods with high standard levels and domestic goods with relatively low standard levels. Focusing on the case of international heterogeneity of levels of a specific standard, he offers an intuitive counter-argument to the fear that free trade necessarily implies a "race to the bottom" of standard levels.[10] Similar

[10]For more on the "race to the bottom", please refer to Wilson, J.D. 1996; Levinson 1996; or Klevorick 1996.

motive of minimum quality standards appears in Lutz' (1996) partial-equilibrium model of vertical product differentiation and trade in which duopolistic firms face quality-dependent costs and compete on quality and price in two segmented markets. Alternative policy arrangements include Full Harmonization, National Treatment, and Mutual Recognition. Standards are found that increase welfare in both regions. Mutual recognition is always better than no regulation.

Theoretically, the most comprehensive model of product standards in international trade was developed by Casella (2001). Standards are defined as public goods improving the functioning of the market, and later are identified as club goods. She argues that in an open market, product standards will be shaped by the activities of international coalitions of the firms, and not necessarily by actions of the government.

3. MODEL

The paper builds a model of different standards in different countries based on a conventional monopolistic competition framework (i.e., Dixit and Stiglitz 1977, or Krugman 1979), and consequent trade agreement formation and harmonization. Products are differentiated not only in the variety space, but also in the standards space. For simplicity assume "discreteness" of a standard: i.e., 0 or 1: the product either does or does not have a certain trait. Standards modeled in this paper can be perceived as an example of vertical differentiation, in which a higher standard implies an enhanced product, and standards with goods can be qualitatively ranked (Helpman and Krugman 1985)[11] – i.e., higher standards are perceived as better; however, such comparisons are subjective. For example, organic fruits and vegetables have stricter standards regarding pesticides but are perhaps more subject to mold or fungus, which for some people can be serious allergens.

In particular, countries have different preferences and costs of attaining certain quality: i.e., an enjoyment from food and cost of providing desired level of safety. Individual countries also derive utility from the number of varieties consumed. Every time a new variety is introduced, the quantity produced of any variety declines and the cost of production rises, but the consumers gain from greater variety, ceteris paribus. Once trade opens, each country produces a set of varieties, and wants to import others with similar levels of safety. Love for variety is present in the model; however, love of variety for food safety is missing, i.e., consumers in each country want a certain level of food safety across all foods. Trade is driven by the love of variety, and potential economies of scale; it is limited by differing food safety restrictions. The benefits of free trade are greater if there is a way to standardize food safety requirements among countries.

We first consider a symmetric two-country case: after analyzing autarky, trade opens, and adjustments to standards under different policies are examined. Later analysis releases the equal size symmetry assumption. Some of the more advanced technical derivations of the

[11]An opposite of vertical differentiation is horizontal differentiation, in which goods are depicted as different without better/worse comparisons. Examples of horizontal differentiation are electrical plugs across the globe, three (incompatible) video program formats – NTSC, PAL, and SECAM, etc.

two-country autarky model are in the Appendix A; however, the reader not interested in the technical details can proceed without consulting them.

3.1 Symmetric Two Country Case

Autarky

Assume two "types" of goods – differentiated and homogeneous – are produced in each country. Only differentiated goods are subject to "standards". We think of the differentiated goods as food, but the model formulation is general enough so that these goods could include computer chips, cell phones, automobiles, or any other good for which consumers prefer to have the good meet certain standards or regulations. Firms in a certain country are compelled to produce at the standard determined (exogenously) by the government, and all varieties of the differentiated good in one country are produced to the same standard. For simplicity assume the level of standard imposed is identical with the level of standard desired by consumers, producers are indifferent as what standard is imposed on them, and there is no lobbying in the model.[12] Assume a large number of potential varieties. Firms in the model do not earn any excess profits, and government does not impose any taxes.

Each country consists of identical individuals wishing to consume both differentiated and homogeneous goods. Each consumer is endowed with one unit of labor only; there is no capital so income consists entirely of wage earnings. The entire stock of labor is used in production; consumers do not derive any utility from leisure. All countries are identically endowed in every aspect (labor, access to production technologies for both homogeneous and differentiated goods, etc.) other than the desired level of standard. The price of the homogeneous good is normalized to one in each country. Assume that home-country consumers prefer the high-quality goods relatively more than do the foreign consumers (in a way that will be made precise momentarily).

Consumption. The utility functions are:

$$U_D = \left(\left(\sum_{i=1}^{n} \left(Y_{Hi} + \lambda Y_{Li} \right)^{\theta} \right)^{\frac{1}{\theta}} \right)^{\alpha} X^{1-\alpha} \qquad \text{and} \tag{1}$$

$$U_F = \left(\left(\sum_{i=1}^{n} \left(\lambda Y_{Hi} + Y_{Li} \right)^{\theta} \right)^{\frac{1}{\theta}} \right)^{\alpha} X^{1-\alpha} \tag{2}$$

where the subscripts D and F refer to domestic (home-country, EU) and foreign (a representative accession country) consumers. In the utility functions X stands for consumption of the homogeneous good; Y denotes consumption of the differentiated goods.

[12]This assumption is not uncommon: consider cases where market forces compel everybody to the same grade and standard, such as Microsoft, or other competitive forces drive uniformity, such as cage sizes for chicken (USDA vs. McDonalds). An extension would be to model determination of governmental standard as well.

The first subscript on Y, H or L, denotes the quality; the subscript i denotes the variety. It is not specified that each variety can be only produced by one country only. Consumer "discounts" the consumption if the variety comes with standard different from the preferred one. More precisely,

$$\lambda = \frac{1}{1+\varphi\left(L-H\right)^2} \tag{3}$$

where H and L are the levels of standard in high-standard country (Home) and low-standard country (Foreign) respectively. "φ" represents a parameter describing the potential magnitude of the deviation from the desired standard on the utility. Since $0 < \lambda \leq 1$, domestic consumers discount the "low-quality" good; while foreign consumers discount the "high-quality" good. Here it is important to recognize that our use of terms "high" and "low" quality serve merely to denote two types of good, and have connotations only from the perspective of the domestic consumer (indeed, the foreign consumer has the opposite connotation). For example, in the U.S. beef is butchered so that many cuts contain parts of more than one muscle; in other parts of the world the tendency is for different cuts to contain only one muscle per cut. Similarly, fruits and vegetables that are "high" quality in the sense of little insect damage may be "low" quality in terms of pesticide use and/or residue. In some countries a "hard" tomato with long shelf life may be "high" quality, in others flavor may be more important quality consideration. Finally, we note that this assumption is not critical to the results: any formulation in which the home country has a greater relative preference (marginal rate of substitution) for the high-quality good than does the foreign country.

In the two stage budgeting process, and due to nature of the upper tier Cobb-Douglass utility function, the consumer spends fixed budget shares on each type of good, regardless the other goods' prices. The sub-utility function for the differentiated goods is of standard CES love for variety type. The demand for the differentiated good is obtained through maximization of the CES utility subject to the budget share available to be spent on the differentiated good. In autarky the taste for standard (or production process or technical regulation) does not appear in the utility function, resulting in the usual CES result in which the demands depend only on prices.[13] Technical derivation of the autarky consumer demands is in the Appendix A.

Production. Each good is produced with only one factor of production – labor. The wage is determined by the marginal value product in the homogeneous good's perfectly competitive industry with constant returns to scale, and is thus fixed in the model.

Standards in the differentiated sector are modeled as a vertical distinction within a variety; a higher standard represents a higher quality in the domestic quality ranking, although with different utility functions foreign consumers will have different relative valuations of the high- and low-quality goods (e.g. Gabszevicz et al. 1981). The autarky setup of the problem – where quality issues vanish – is identical with Krugman's (1979) monopolistic competition

[13]If quality dimension does not change, but the utility does, no signal is sent to the firms regarding what quality to produce. Therefore, in the absence of quality signaling (or social planner) firms will produce lowest quality as it costs more to produce a higher quality. In addition, unless other assumptions are imposed, with constant expenditures utility function firms will maximize profits while minimizing production costs: i.e., produce the smallest unit and sell it at the highest price.

model. Increasing returns in the differentiated sector are internal to firms – an initial outlay of labor (fixed cost) is needed to start up production. Fixed costs are common across all varieties in a certain country, but they differ across standards; the high-standard quality is costlier to produce than low-standard quality. The marginal cost is constant across qualities and countries, leading to scale economies in the production of any variety-quality specification. Since in any country all firms are required to produce up to a common standard, each firm in the country faces the same cost function. Thus, all varieties are perfect substitutes in production. The presence of the scale economies ensures that in equilibrium only a finite number of varieties are produced, and each firm produces a different variety. The number of varieties produced within the economy is determined by the number of firms. Firms can enter freely into the differentiated industry. The usual profit maximization and zero-profit entry conditions apply, which along with consumer demands determine price and production levels. Technical derivations of autarky productions in both high- and low-standard cases are in the Appendix A.

To sum up the autarky: due to identical preferences and endowments each country produces the same amount of the homogeneous good. The price of X is normalized to one, and consequently the wage rate is determined in the zero-profit constant returns to scale homogenous sector as the marginal value product of labor in this sector. In the differentiated sector (graphed in Figure 1), production functions differ across countries owing to dissimilar standards and different fixed costs. Due to constant elasticity of demand for each variety, price levels in both low- and high-standard countries are the same. Compared to high-standard consumers, agents in low-standard country consume less of each variety, but have more varieties available.

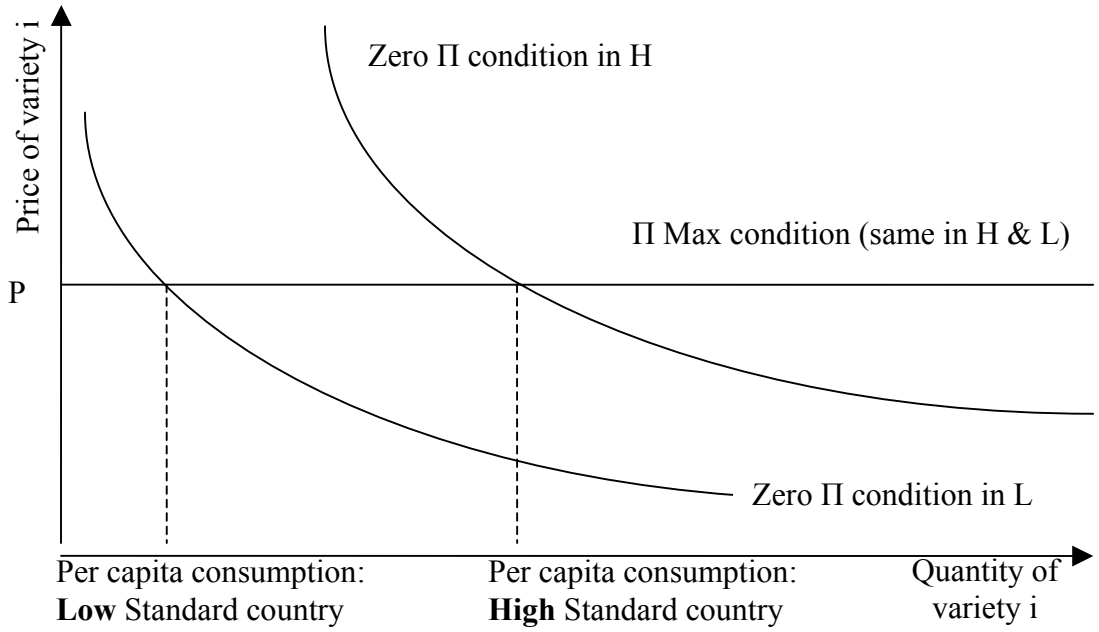


FIGURE 1: Autarky Production and Consumption in High- and Low-Standard Countries

Figure 2 illustrates the autarky decision in a general equilibrium framework by linking utility and standards. Curve $A_H A_L$ is a production possibility frontier for variety i. Due to symmetry

imposed in the production, the same holds for all varieties. Only two qualities – high and low – are possible. PPF is convex to the origin due to increasing returns to scale, and asymmetric due to the differences in fixed costs. With autarky amount of labor available in each country, it is feasible to produce A_H units of high quality, or A_L units of low quality version. From the Eq. 1, consider the utility from consuming both high (H) and low (L) standard of variety i at domestic country to be:

$$U_H^i = \left(Y_{Hi} + \lambda Y_{Li}\right)^\theta \tag{4}$$

Similarly, from Eq. 2 in the Foreign country:

$$U_F^i = \left(\lambda Y_{Hi} + Y_{Li}\right)^\theta \tag{5}$$

Utilities are represented by appropriate indifference curves: The home-country consumers' indifference curve originates at A_H, the foreign at A_L. The equilibrium is a corner solution, in which home produces and consumes at A_H, while foreign consumes and produces at A_L. That is, the home country chooses standard H while the foreign country chooses standard L, and all production exactly meets the respective standard.

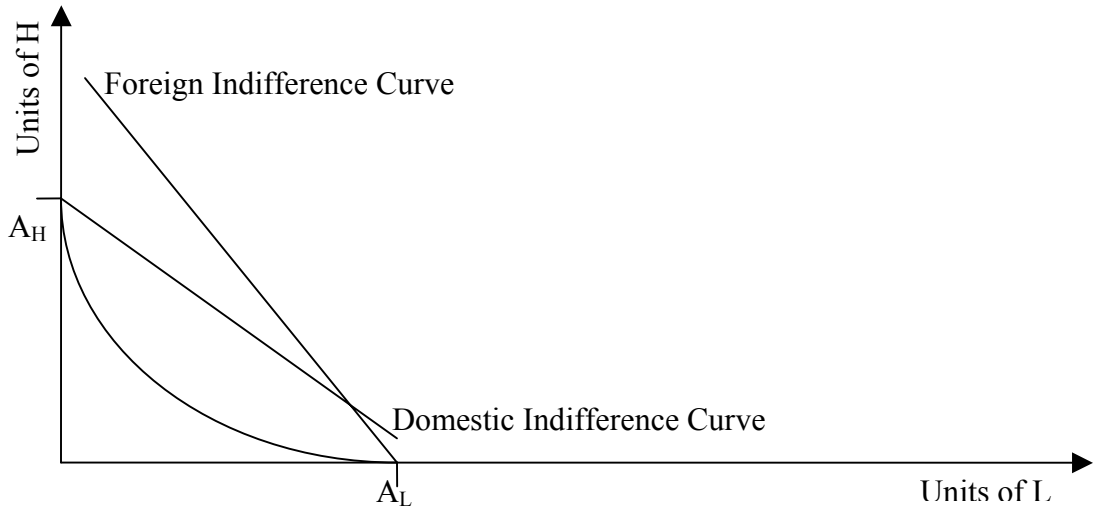


FIGURE 2: Autarky Decision in General Equilibrium

Open Trade

Assume labor is not mobile internationally[14]. Disregard problems related to CAPs, i.e., each country recognizes each others' procedures, and does not require double testing and/or standardization. Also assume the high standard at home is scientifically justified on WTO grounds, and not imposed only as a technical barrier to protect domestic producers. Recall countries in the model are small, of equal size and market power. As all varieties within a country are produced to a certain standard, our discussion is reduced to a "representative" variety. In the world of identical endowments and production technologies, the homogenous good remains non-tradable: neither country has a comparative advantage in producing it; there are no economies of scale and/or love for variety to be explored.

[14]Recall wage in this model is determined in the CRTS sector, and is the same in both sectors. In the absence of the homogeneous sector, and if labor was mobile internationally, and standards would not enter the consumer's utility function, labor would move and concentrate in the low standard country.

Trade in the differentiated sector is driven by potential gains from economies of scale in form of a market expansion, as well as higher number of available varieties[15]. Therefore, potential equilibria, in addition to autarky (in which each country produces and consumes own set of varieties produced at desired domestic specification) are:

1. The standards are too far apart and there are no gains from trade to be had, and so there is no trade even if it is legally and technically possible (i.e. we do not assume autarky);
2. High-standard country will not accept low standard goods, but low-standard country is willing to accept high standard goods; and
3. Compromise on standard.

Ad 1: No trade occurring due to large differences in standards.

In this case standards are too far apart and there are no gains from trade to be had. Thus, there is no trade even if it is legally and technically possible (i.e. we do not assume autarky). Countries endogenously choose not to purchase other goods, as there are no benefits. Similarly, if economies of scale are not sufficient to justify harmonization or compromise, no trade occurs. Graphically on Figure 3, this would occur when a foreign indifference curve passing through A_L on the horizontal axes would intersect the vertical axes above $1/2T_H$, leaving foreign better off by staying in autarky than trading and adjusting standards.

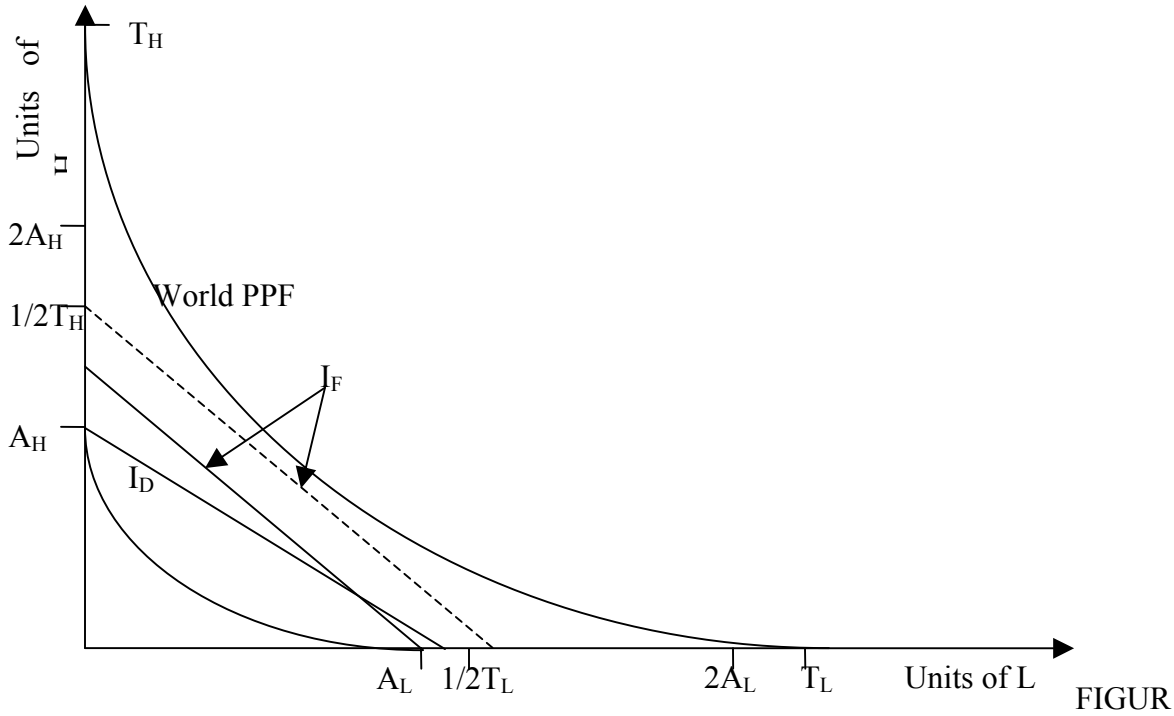
Ad 2: High-standard country will not accept low standard goods, but low-standard country is willing to accept high standard goods.

Since the high-standard country is not subjecting low-standard country producers to higher specifications than its own domestic high standard producers, this practice is permissible under the WTO rules assuming higher standards are scientifically justified. Examples would include EU regulations regarding GM foodstuffs in the food chain, or setting minimum nutrition or maximum residue requirements.

In the starting position foreign standards are low. Low-standard consumers are willing to consume the high-quality good if compensated somehow, and conversely with trade, production costs fall due to economies of scale. There is a possibility that the reduced production costs are sufficient to induce one of the parties to change their standard. This situation is depicted in Figure 3. The PPF A_LA_H and the foreign indifference curve through A_L start the foreign situation in autarky. With the opening of trade, the labor allocation in production of this variety doubles; additionally, a single firm could produce all of the world's demand for this variety and thereby capture economies of scale. Thus the trade PPF has endpoints $T_H>2A_H$ and $T_L>2A_L$. Moreover, because the higher costs of meeting the higher standard are captured in the fixed cost term, the economies of scale are greater in the production of the high-standard good. This means that the proportionate increase in the endpoint on the ordinate (high-standard axis) is greater than the proportionate increase in the endpoint in the abscissa (low-standard axis): $T_H/A_H>T_L/A_L$.

[15]Due to symmetry and model specification (fixed, rather than marginal costs are standard variant), all varieties produced in the world – regardless of their standard – are equally priced.

By definition the foreign (i.e., country starting with low standard) has half of the labor force, allowing it to be either at $1/2T_H$ (when producing on the high standard), or A_H (when it produces on the low standard). Thus, the choice for the foreign country is between $1/2T_H$ and A_L. However, $1/2T_H$ guarantees higher obtained utility from variety i, and thus the foreign country decides to accept the higher standard, preferring more of high quality good in trade to less of the low quality good in autarky production. The same holds for each variety consumed, and when summed across varieties, the utility of the foreign country increases. Due to symmetry of the domestic and foreign indifference curves, the foreign indifference curve I_F intersects the ordinate below $1/2T_H$, but the domestic indifference curve I_D intersects the abscissa to the left of $1/2T_L$. That is, the economies of scale are sufficient to compensate the foreign country to harmonize standards at H, but insufficient to compensate the domestic country for harmonization of standards at L. Consequently we assume that standards are harmonized at H (the case of intermediate standard is dealt with momentarily).



FIGUR E 3: Decision to Harmonize

Thus, the high standard prevails and firms are realizing economies of scale from access to a bigger market. Consumers in both countries enjoy larger number of varieties. Due to symmetry in prices of varieties and balanced trade, each country is trading the same number of varieties. In the high-standard country the utility increases due to larger number of varieties supplied at the desired level of standard.

Ad 3: Compromise on standard.

To document a concession, release the zero-one assumption on the standard, and allow for adjustments in standards to be made. By compromising on a standard the countries increase the possibility of mutually beneficial trade. Assume the high-standard country lowers its

standard from H to H'. For simplicity assume there is no change in the low-standard country. Since the cost of producing goods of quality H' is less than the costs of producing goods of quality H, the new autarky PPF becomes $A_H'A_L$. As illustrated in Figure 4, with open trade the world PPF becomes $T_H'T_L$. The foreign-country indifference curve passing through A_L also rotates, as the change in quality from H to H' also changes the consumers' marginal utility of the high-quality good relative to the low-quality good. Because the standard H' is closer to the foreign standard that is H, it takes fewer units of H'-quality goods to equal in utility one L-quality good (in the foreign utility function); consequently the indifference curve rotates counter-clockwise.

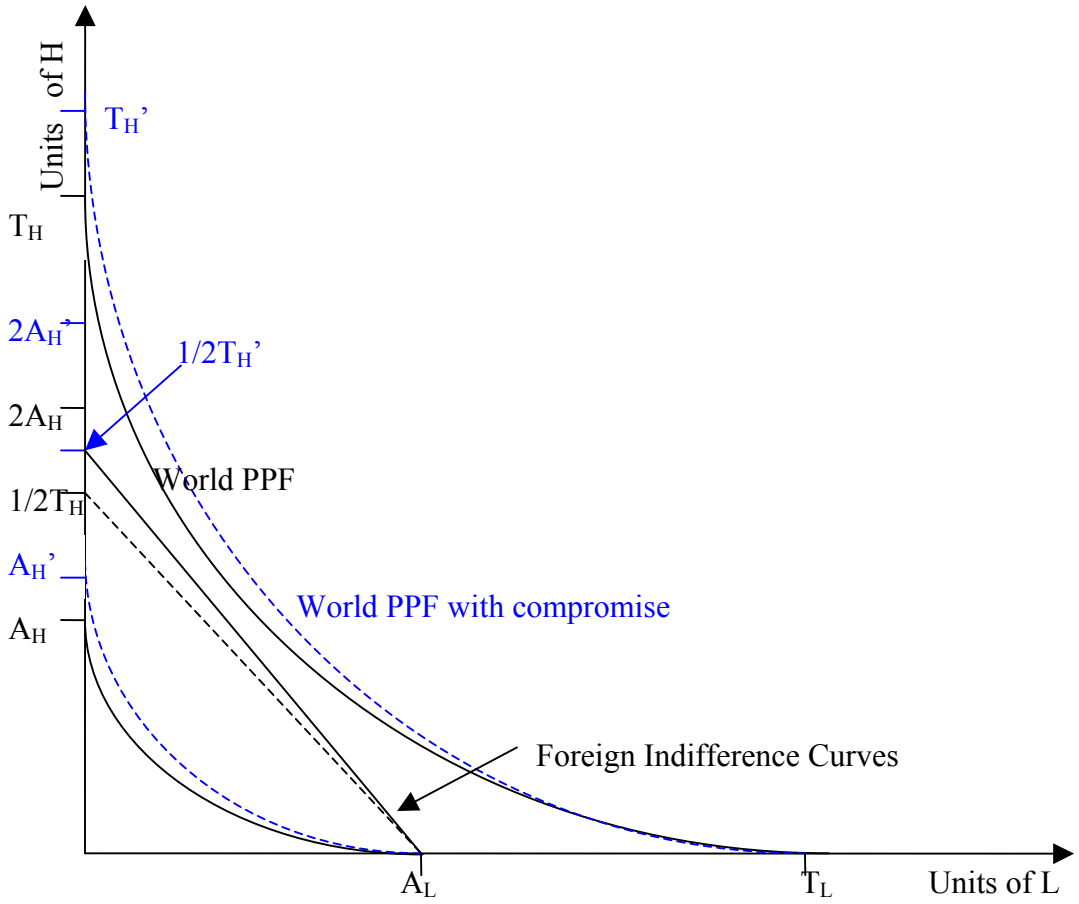


FIGURE 4: Decision to Compromise: The Foreign Perspective

The two effects of the compromise on the H-standard are thus to expand outward the PPF on the high-standard axis, and to pull inward the indifference curve on that same axes. These two effects are reinforcing in the sense each increases the possibility and a extent of gains from trade from the perspective of the foreign country.

Decision to compromise from the home-country perspective is depicted in Figure 5. Assume H-standard is lowered to H'. The change shifts the indifference map, as well as the slope of the indifference curve. If the quality adjusted $1/2T_H'$ lies above A_H, the domestic country will prefer trade.

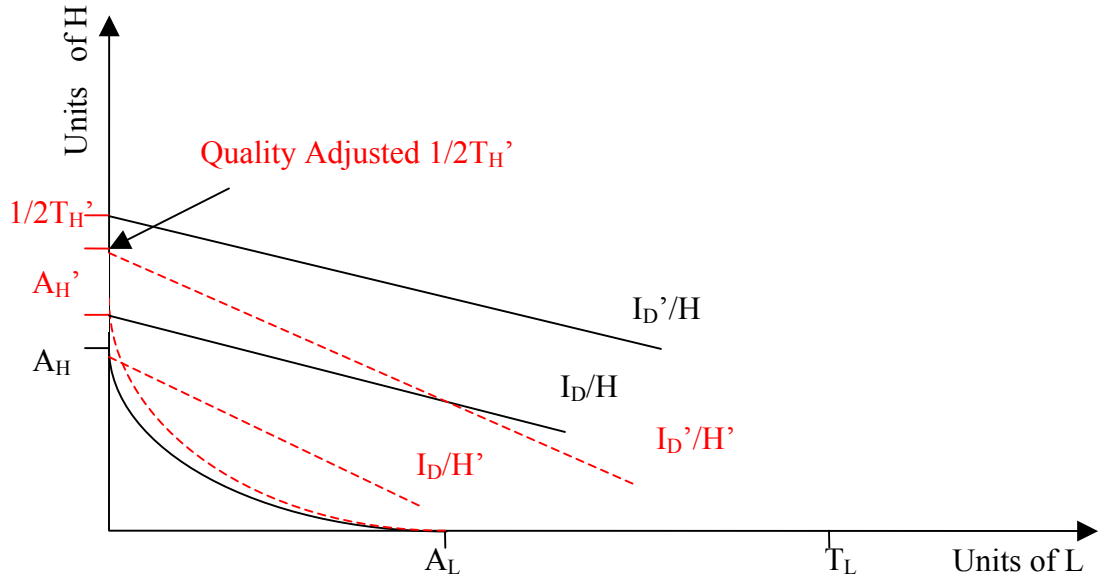


FIGURE 5: Decision to Compromise: Home-Country Perspective

Case described above represents a one-way compromise, however, a case when high-standard country lowers the standard by providing for greater flexibility in allowing exceptions is not uncommon. In this case both high- and low-standard countries are willing to adjust their standards. A small adjustment downwards from the upper limit of a standard would leave the high-standard country at least as well off or better off due to increased variety, and realized economies of scale[16]. Similar adjustment holds for the low-standard country as well, leaving both countries better off. Nevertheless, even if potential Pareto improvement could occur, the political difficulty in negotiating the access to the Pareto improving point is well known.

3.2 Two Countries Case with Symmetry Released – Political Economy Argument

In the symmetrical case we showed three different policies regarding the standards adjustments justifying their modification. At this point we release the assumption of equal size measured by endowments. Resulting is a game in which the power in setting standards belongs to the country with larger market. Consider a small (i.e., accession) and large country (EU) opening trade. In terms of market, large country is gaining access to a much smaller market than the small country is. Thus, even without the requirement of *aquis* adoption as a condition of admission, small country is better off adopting big country's standards and realizing economies of scale, than large country adopting the small country's standard.

Now assume large country is a high-quality producer, as in Figure 6. Small country's PPF is represented by A_HA_L, while large country produces on A_H'A_L'. In this case small country can proportionally prefer to be in A_H than A_L. Not purely due to a power argument, but it is better for small country to adjust.

[16]In case of a differently specified model, terms of trade effects would influence the adjustment as well.

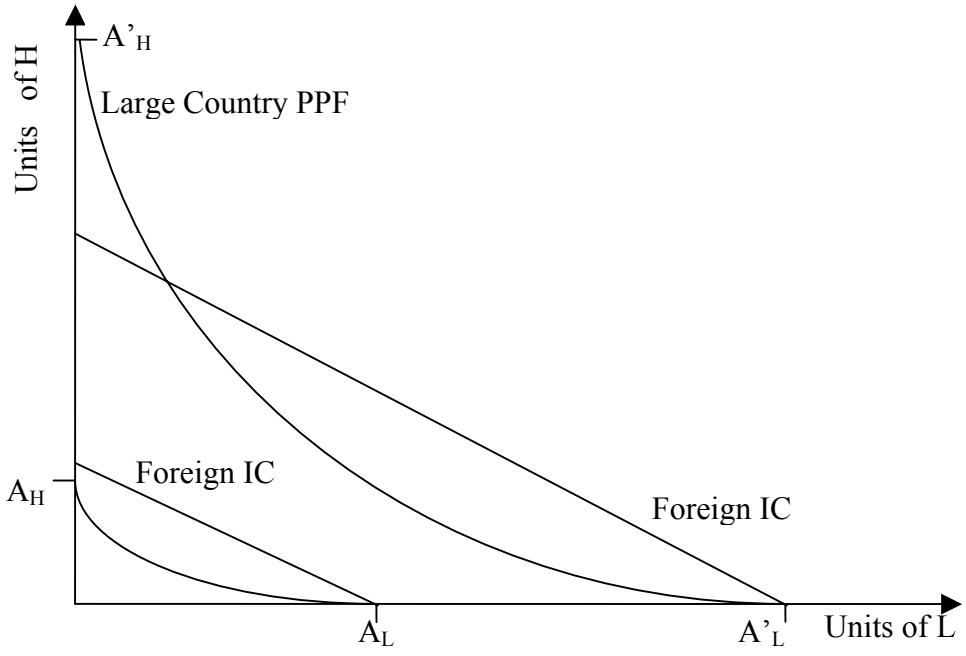


FIGURE 6: Small vs. Large Country

Also in the basic case homogeneous – i.e., non-standardized – good was non-tradable as neither country had a comparative advantage in its production, nor the trade was driven by tastes for variety. Once the symmetry is released, in the extreme case the size of the small country might not allow setting up a production according to high quality standards due to high fixed costs investment (consider, for example, pharmaceutical research and development costs). Small country then will produce and export the homogeneous good, while importing varieties from the large – high-standard – country.

Economic characteristics – although important – could be outbalanced by a political will, usually from the small country, and political power, no doubt from the large country. This is especially the instance of small countries seeking accession into a well-established structure. Their cost-benefit analyses of membership may/may not be calculated purely on the economic grounds, and the decision to comply with the membership requirement includes some sort of a "political externality" of belonging to supra-national structures and experiencing a synergy effect. In this case the non-monetary and non-economic gains for accession countries might exceed the costs, especially when potentially adjusted for future benefits in form of free movement of labor and assistance from the Union. Appendix B compares the existing and accession members in terms of their area, population, and GDP.

Standards setting – or, perhaps more precisely, harmonization – has been greatly influenced by expansions of multinational corporations supplying their outlets from both domestic and foreign sources, and requiring provisions of consistent standard and quality. Anecdotal evidence shows multinationals tend to originate in high-standard countries, and consequently require high-standard suppliers abroad. An example of such a multinational would be McDonald's highly selected contractors overseas. Thus, by the efforts of accession countries to attract foreign investors, harmonization without forced governmental intervention takes

place. Although multinationals are certainly influenced by the legislation in their home country, they support Casella's (2001) idea of not governments, but firms developing standards, and consequent role of government and other certifying bodies within a country.

4. CONCLUSIONS

This paper explored two phenomena: integration of the CEE countries into the EU and national differences in quality standards using Krugman-style internal scale economies[17]. In the framework described above, the accession country had three choices: produce the differentiated good at the EU standard and sell this good to other EU countries, produce the differentiated good at a low quality standard and consume all production of this good domestically, or produce the homogeneous good and trade this to the EU for the high-standard differentiated good. Countries' governments are important economic agents – without their participation firms could choose to remain in a "low-standard" equilibrium producing the low quality differentiated good at low fixed cost. In this case, the deeper integration associated with accession may be limited. However, the government can choose to impose the EU quality standards (e.g. Poland is imposing EU standards on cherry producers prior to accession), thereby requiring domestic firms to produce the high-standard differentiated good or go into another business. It is clear that the accession into the EU coupled with the government decision about standards has welfare implications—both for consumers and producers, in both the accessing country and the EU. In the accessing country, producers adapting to new standards gain from an access to a larger market, and thus better utilize economies of scale. Producers with guaranteed exemption are unable to fully utilize their economies of scale, as they are only allowed to produce for domestic market only, and thus remain in autarky. Similarly, already harmonized producers in the original bloc win from having access to a larger market, although the increase in their market size is smaller than the increase for accession producers. Consumers in the original bloc gain from having access to larger number of varieties at their preferred preference level. Although consumers in the accession country have access to larger number of varieties, it is not at their originally preferred level of standard.

We also conclude that industries with more increasing returns to scale are more likely to reach conclusion in the world of voluntary harmonization and minimum product requirements. However, with political willingness to belong to the integrated European structures, current economic costs (i.e., temporary loss in welfare) might lose their original appeal when confronted with future benefits and political agenda. In addition, harmonization is also possible to be accomplished indirectly, via foreign direct investments.

Benefits of belonging to a trade agreement stated earlier – regardless of the level of integration – clearly apply in this case. Bringing the trade into consideration, most of the trade of the accession countries already originates and goes into countries in the region, and trade barriers within most of the CEE countries was previously eliminated by the Central European Free Trade Agreement (CEFTA). In the accession process the market is enlarged

[17]Potential drawback of our analysis is abstraction from price considerations, as different fixed costs in the model result in the same price being charged for each variety, while the number and quantity of varieties consumed in each country varies.

even further, and "deeper integration" occurs between the EU and the CEE countries. Starting from the Uruguay Round, the EU negotiated as one entity: on one hand, this reduces the number of parties negotiating concessions; on the other hand, it brings to the table a much stronger partner than several smaller, albeit still powerful countries. Thus, adding new members potentially eases the WTO negotiations; however, it also complicates the processes within the Union, as well as its decisions on proper position.

Naturally, technical harmonization as a condition of free movement of goods is just the first step in the series of synchronization needed to be accomplished to obtain full membership in the Union. Next comes the adoption of environmental and labor laws, and the entire legal system to form a proper and functioning legal and political nexus. Consequently, institutional change triggered by the accession process and affecting all branches of the society occurs.

5. APPENDICES

Appendix A: Two Country Autarky Case

Consumption

In autarky the utility function for Home reduces to a standard CES subutility function:

(A1) $$U_H = \left(\left(\sum_{i=1}^{n} (y_{Hi})^{\theta} \right)^{\frac{1}{\theta}} \right)^{\alpha} X^{1-\alpha},$$

while in Foreign:

(A2) $$U_F = \left(\left(\sum_{i=1}^{n} (y_{Li})^{\theta} \right)^{\frac{1}{\theta}} \right)^{\alpha} X^{1-\alpha}$$

In all cases:

(A3) $$\theta = \left(1 - \frac{1}{\sigma}\right), \sigma > 1$$

Representative consumer Home (same in Foreign) solves the following problem:

(A4) $$\max U_H \quad X, \{y_i\}_{i=1}^{n} \; s.t. \sum_{i=1}^{n} p_i y_i + X = w$$

In the two stage budgeting process, and due to nature of the utility function, the consumer spends fixed budget shares on each type of goods:

(A5) $X = (1-\alpha) w$ on the homogeneous good, and

(A6) $\sum_{i=1}^{n} p_i y_i = \alpha w$ on the differentiated good.

The demand for the differentiated good is obtained through maximization of CES utility subject to the budget share available to be spent on the differentiated good, resulting in the usual CES result.

(A7) $$y_i = \frac{p_i^{-\sigma}}{\sum_{i=1}^{n} p_i^{1-\sigma}} \alpha w$$

Production

Recall countries are identical in every aspect other than standard, resulting in different fixed costs across countries. Without a loss of generality assume that Foreign produces "Low cost = low standard" qualities of the differentiated goods, while Home produces the "High cost = high standard" quality. Due to symmetry imposed in the model, in equilibrium in each country each firm will be the same, producing the same quantity (y), and charging the same price (p). Table 1 compares the autarky situation in both countries.

TABLE 1: Comparison of Autarky in Low and High Standard Country

AUTARKY	"Low cost = low standard"	"High cost = high standard"
	Homogeneous sector	
Production	$X = L_X$	
"X" goods market clearing	$X_S = X_D$ $L_X = (1-\alpha) wL$	
	P_X normalized to 1, w = 1	
	Differentiated sector	
"Standard"	$\delta_L < \delta_H$	
Fixed cost	$F_L = F(\delta_L)$	$F_H = F(\delta_H)$
	$F_L < F_H$	
Production	$l_{y_i}^L = F_L + y_i^L M$	$l_{y_i}^H = F_H + y_i^H M$
Total cost	$wl_{y_i}^L = wF_L + wy_i^L M$	$wl_{y_i}^H = wF_H + wy_i^H M$
	Wage is determined in the homogeneous sector of each country, and is the same (w=1).	
Zero profit condition (P_i=AC_i)	$p_i^L = \frac{wF_L}{y_i^L} + wM$	$p_i^H = \frac{wF_H}{y_i^H} + wM$
	$\frac{p_i^L}{w} = \frac{F_L}{y_i^L} + M$	$\frac{p_i^H}{w} = \frac{F_H}{y_i^H} + M$

TABLE 1: Comparison of Autarky in Low and High Standard Country (cont.)

Profit maximization condition ($MR_i=MC_i$)	$p_i^L(1-\frac{1}{\sigma})=wM$	$p_i^H(1-\frac{1}{\sigma})=wM$
	$\frac{p_i^L}{w}=\frac{M}{\left(1-\frac{1}{\sigma}\right)}$	$\frac{p_i^H}{w}=\frac{M}{\left(1-\frac{1}{\sigma}\right)}$
"Y" Goods market clearing	$y_i^L=Lc_i^L$	$y_i^H=Lc_i^H$
Due to symmetry $\forall i$	$p_i^L=p^L$	$p_i^H=p^H$
	$y_i^L=y^L$	$y_i^H=y^H$
	$c_i^L=c^L$	$c_i^H=c^H$
Equilibrium output	$y_i^L=\frac{F_L(\sigma-1)}{M}$	$y_i^H=\frac{F_H(\sigma-1)}{M}$
	$y_i^L<y_i^H$ (Careful about interpretation due to differing quality)	
Labor market clearing	$\sum_{i=1}^{n} l_i+L_X=L$ $\sum_{i=1}^{n}(F+My_i)+L_X=L$	
Equilibrium number of firms	$n_L=\frac{L-L_X}{F_L\sigma}$	$n_H=\frac{L-L_X}{F_H\sigma}$
	Number of varieties in the low-standard country is bigger than in the high-standard country due to differences in the fixed cost.	

Due to constant elasticity utility function in both countries, prices are the same in each country regardless the standard imposed. Thus, potential gains from opening trade – assuming the issue of differing standards is to be resolved – are in higher available choice of varieties.

Appendix B: EU vs. Accession Countries in Terms of Area, Population, and GDP

Member States	Area (sq km)	Population (million)	GDP (millions USD)
Austria	83,858	8.170	188,742
Belgium	30,510	10.275	227,618
Denmark	43,094	5.339	162,817
Finland	337,030	5.184	121,987
France	547,030	59.766	1,302,793
Germany	357,021	83.252	1,873,854
Greece	131,940	10.645	116,347
Ireland	70,280	3.883	101,185
Italy	301,230	57.715	1,090,910
Luxembourg	2,586	0.449	19,802
Netherlands	41,526	16.068	374,976
Portugal	92,391	10.084	108,479
Spain	504,782	41.077	577,539
Sweden	449,964	8.877	210,108
United Kingdom	244,820	59.778	1,406,310
EU TOTAL	**3,238,062**	**380.562**	**7,883,467**

Candidate Countries	Area (sq km)	Population (million)	GDP (millions USD)
Bulgaria*	110,913	7.621	12,714
Cyprus	9,250	0.767	8,698
Czech Republic	78,866	10.257	56,424
Estonia	45,226	1.416	5,281
Hungary	93,030	10.075	52,361
Latvia	64,589	2.367	7,549
Lithuania	65,200	3.601	11,834
Malta	316	0.397	3,565
Poland	312,685	38.625	174,597
Romania*	237,500	22.318	39,714
Slovakia	48,845	5.422	20,522
Slovenia	20,273	1.933	18,810
Turkey*	780,580	67.308	147,627

*Bulgaria and Romania do not fully meet the economic and *acquis* criteria. Turkey does not fully meet the political, economic or *acquis* criteria (EU, 2003).

Data Sources: Population: July 2002 estimates from the 2002 World Factbook.
2001 GDP: World Development Indicators, World Bank, August 2002.

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