

**Standards, Trade, and Development:  
A Quick Look at Regulation and Information Technology**

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- Draft -

**Summary**

The expansion of global trade over the past fifty years has contributed to economic welfare, poverty reduction, and human development in important ways. The World Bank projects that global trade could expand by more than threefold to \$27 trillion by 2030 (World Bank 2007). Growth in developing countries over this period – in part fueled by trade -- could cut the number of people living on less than \$1 per day by half – to 550 million (World Bank 2007). The removal of government from directing economic activity – including technology development, private sector decision-making, and world trade markets – can continue to be an important engine through which these goals can be achieved. It is within this broad context, I believe, that standards and technical

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regulations should be viewed. There is both empirical evidence and the case study evidence of history to support this view.<sup>2</sup>

Private sector-led standards -- and increasingly open standards systems developed in the information technology and communications industries -- promise a strong platform for continued innovation and economic advance. It is not fundamentally a question of how private standards are developed, but rather once produced, how or whether a regulatory intervention develops. If regulation is required, balanced against the need for intellectual property protection, consumer welfare, benefits of public inter-connectivity or other dominant concerns, it must be based in non-discrimination, transparency, and other well established economic principles.

As such, the rise of non-tariff technical barriers to trade, including government attempts to shape technology markets, is a threat to global welfare and the poverty reduction that open markets and trade promotes. This is not simply a question of barriers in developed countries – it is also the barriers (both at and behind the border) that developing countries maintain. In regard to the information technology and communications sector, several steps could be considered in a trade context to address challenges and threats to growth and trade expansion of non-tariff, technical barriers.

The Information Technology Agreement (ITA) of the World Trade Organization made significant progress in eliminating tariffs on information and telecommunications products. Extension of the ITA to non-tariff measures, including standards, testing, certification, and other issues makes a good deal of sense. Progress in a conclusion to the

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<sup>2</sup> See for example in regard to regulation the data in the World Bank Doing Business 2007 report on regulatory barriers to business and economic activity.

Doha negotiations is extremely important, but talks under the ITA can move ahead under its own mandate. Can the Technical Barriers to Trade Agreement be amended to address sector specific concerns, including principles on standards development in information technology? This is unlikely, given the apparent lack of support and interest in re-opening the agreement. What would clearly help, in an overall context, is a new and serious multinational effort (public and private) to develop new empirical data and evidence on standards – in a broad context (link to intellectual property rights, technology development, trade, various modes of standards development and their differing impacts, etc.) This is a clear and evident need and one that cannot be ignored. There are consortia for standards development, why not a “Global Standards Consortium” devoted to the study of policy-relevant questions on standards, technology, and economic development?

### **Background**

Technical regulations, such as product certification requirements, performance mandates, testing procedures, conformity assessments, and labeling standards, exist to ensure consumer safety, network reliability, interoperability, or other goals. In principle, product standards<sup>1</sup> play a variety of roles in overcoming market failures. For example, emission standards for cars motivate firms to internalize the costs of promoting environmental quality. Food safety standards help to ensure that consumers are protected from health risks and deceptive practices, information about which would not ordinarily

be available in private markets. Standards in the information technology and communications sector can insure interoperability of systems and networks.

For consumers, efficient and non-discriminatory standards allow comparison of products on a common basis in terms of regulatory characteristics, permitting enhanced competition. From the producers' perspective, production of goods subject to recognized and open international standards can achieve economies of scale and reduce overall costs. Since standards themselves embody information about technical knowledge, conformity to efficient standards encourages firms to improve the quality and reliability of their products.

Standards also may reduce transaction costs in business by increasing the transparency of product information and compatibility of products and components (David and Greenstein, 1990<sup>2</sup>). This is possible as technical regulations can increase the flow of information between producers and consumers regarding the inherent characteristics and quality of products. Jones and Hudson (1996), using a model with a variance reduction approach, argued that standardization reduces the costs of uncertainty associated with assessing product quality. Cost savings are reflected in the reduction of time and effort which consumers spend on search.

Despite the potential to expand competition and trade, standards may be set to achieve the opposite outcomes. In general, standards can act to raise the compliance costs of some firms (e.g., new entrants) relative to other firms (e.g., incumbents) thereby restricting competition. Fischer and Serra (2000) examine the behavior of a country that imposes a minimum standard (MS) on a good produced by a domestic firm and a foreign

competitor. In their model, costs rise with the standard, and there is a fixed setup cost of producing at two standard levels. Depending on the size of the foreign market and the fixed setup cost, they showed that the domestic firm will lobby for the lowest MS that excludes the foreign firm or for no standard at all.

Indeed, there has been a rising use of technical regulations and standards as instruments of commercial policy in the unilateral, regional, and global trade contexts (Maskus and Wilson, 2001). As traditional barriers to trade have fallen, these non-tariff barriers have become of particular concern and are a threat to continued benefits of open trade to both *developed and developing nations*.

The costs associated with foreign standards and technical regulations may be borne publicly and privately. But developing countries typically have neither the public resources required to provide national laboratories for testing and certification nor the capability for collective action to raise their standards. As a result, a significant portion of meeting the costs of standards may be borne by individual firms.

Given this context, standards and technical regulations are an increasingly prominent part of international trade policy debate. This is particularly true in regard to how standards affect exporters and the costs and benefits for global trade in adopting consensus international standards and removing discriminatory technical barriers. It is within this context, I believe, that open standards in regard to the information technology industry should be viewed.

Unfortunately, there have been few empirical studies that examine the impacts of standards imposed within the framework of trade-offs of setting standards at international

levels, unilaterally, via consortia, or other methods – including sector studies in the information technology and communications sector.

There have been several studies completed recently, however, based on the World Bank Technical Barriers to Trade (TBT) Survey database. The database provides firm-level data on production and export activities, cost structures, impediments to domestic sales and exports, and compliance with standards and technical regulations.

### **Summary Results from Selected Studies**

The World Bank Standards and Trade Survey (2004) produced firm level data on the impact of technical requirements and standards on developing country exports. The intent of the survey was to solicit input from agricultural, manufacturing, and trade firms in various emerging market countries regarding technical barriers encountered, which impact their ability to successfully export products. The data provides financial information for each firm and affect of domestic and foreign technical regulations on exports, international standards, and other various impediments to business and export.

The data collected covers 689 firms in 24 industries in 17 developing countries. The use of a uniform methodology across countries and industries enables comparison of standards and regulations, and their impacts on firms' production and conformance activities between countries and industries. Information on technical regulations specific to five major export markets also enables us to compare the stringency and importance of technical regulations by export markets. These five export markets include the EU, USA, Japan, Canada, and Australia.

An overview of the results and descriptive statistics results from data for the 17 countries in the World Bank Standards and Trade Survey is provided in Wilson and Otsuki (2004). The major findings include those related to general factors that affect businesses in these developing countries and export success. Among the major barriers are limited access to credits and low demand for both exporting and non exporting firms. Product quality is also reported to be a major factors affecting export success. For firms that are willing but unable to export, low demand and costs of transporting goods are major impediments to exports.

Part of the new research agenda on product standards examines how standards affect two types of costs on firms: fixed and variable. The former can determine the entry decisions for firms seeking to access foreign markets, while the latter can determine the propensity to export once entry decision was taken. Chen, Otsuki and Wilson (2004) examines how meeting foreign standards affects firms' export performance, reflected in export propensity and market diversification. Results suggest that technical regulations can adversely affect firms' propensity to export in developing countries. In particular, testing procedures and lengthy inspection procedures reduce exports by 9% and 3%, respectively.

Furthermore, in the model deployed in this analysis, the difference in standards across foreign countries causes diseconomy of scale for firms and affects decisions about whether to enter export markets. The results suggest that standards, under certain conditions, can impede exporters' market entry, reducing the likelihood of exporting to

more than three markets by 7%. In addition, firms that outsource components are more challenged by compliance with multiple standards.

The costs of compliance to standards involve payments for additional inputs, such as capital and labor. The issue is analyzed, in the context of a production function, in Maskus, Otsuki and Wilson (2005). The authors develop econometric models to provide the first estimates of the incremental production costs for firms in developing nations in conforming to standards imposed by major importing countries. Results indicate that standards do increase short-run production costs by requiring additional inputs of labor and capital. A 1 percent increase in investment to meet compliance costs in importing countries raises variable production costs by between 0.06 and 0.13 percent, a statistically significant increase. Among other findings are that the fixed costs of compliance are non-trivial; approximately \$425,000 per firm or about 4.7 percent of value added on average.

The results in this paper may be interpreted as one indication of the extent to which standards and technical regulations can constitute barriers to trade. While the relative impact on costs of compliance is relatively small, these costs can be decisive factors driving export success for companies. In this context, there is scope for considering that the costs associated with more limited exports to countries with import regulations may not conform to World Trade Organization rules encouraging harmonization of regulations to international standards, for example. Policy solutions then might be sought by identifying the extent to which subsidies or public support

programs are needed to offset the cost disadvantage that arises from non-harmonized technical regulations.

The issue of harmonized standards and their impact on trade is examined in Chen, Suzuki and Wilson (2006). The paper focuses on the effect of Mutual Recognition Agreements (MRAs) on exports from developing countries. Negotiations involving standards raise issues that are both politically and analytically challenging. Unlike tariffs, standards cannot be simply negotiated away. The primary purpose of standards should center on the enhancement of welfare by remedying market failure – arising, for example, from safety attributes of products, negative environmental externalities, or product incompatibility due to the producers' failure to coordinate. Agreements on standards must therefore secure the gains from integrated markets without unduly compromising the role of standards as remedies for market failure. Not only are the motives for standards ostensibly aimed at maximizing welfare but they should be applied in a non-discriminatory manner on both foreign and domestic firms. However, in spite of the supposed symmetry of treatment, the impact on trade can be highly asymmetric because the costs of compliance can differ across countries.

There are in fact three main types of agreements dealing with technical barriers to trade. The simplest and potentially most powerful is the mutual recognition of existing standards, whereby a country grants unrestricted access of its market to products that meet any participating country's standards. This was the approach taken in principle by the European Union, with the spur of the Cassis de Dijon judgment of the European Court of Justice. Mutual recognition agreements (MRAs) are, however, not likely to be

an option if there is a significant difference in the initial standards of the countries, as became evident in the context of the European Union.

In such cases, a certain degree of harmonization is a precondition for countries to allow products of other countries to access their markets. The most important example of such harmonization is the New Approach of the European Union, which resulted in a set of directives from the European Commission setting out essential health and safety requirements for most regulated products.

In other cases, neither mutual recognition nor harmonization of substantive standards may be deemed feasible or desirable. Countries may nevertheless choose at least to mutually recognize each other's conformity assessment requirements, i.e. country A trusts country B to certify that the products made by country B conform to country A's standards. In this case, producers from country B may still face different standards in different markets, as opposed to mutual recognition case. Conformity assessment could be done locally resulting in lower costs of compliance.

Examples of the MRA approach include the intra-EU mutual recognition system in sectors where there are no EU harmonized directives and the EU's agreements with a number of other countries. A key element of these agreements is the rule of origin. The MRAs between the EU and USA and the EU and Canada specify that conformity assessment done in one of the MRA countries, in which products are manufactured or through which they are imported, is accepted throughout the entire agreement region. Other agreements, such as the MRAs the EU has concluded with Australia and New

Zealand, impose restrictive rules of origin which require that third country products continue to meet the conformity assessment of each country in the region.

This draft paper addresses the question of how Mutual Recognition Agreements (MRAs) on conformity assessment between two trading partners affect firms' export decisions in developing countries. Specifically, we examine two distinct aspects of export behavior of firms, namely, *whether to export* and *how much to export*. We also compare such effect with that of the traditional Preferential Trade Agreements (PTA), which has been focused on reducing tariffs.

Preliminary findings indicate that MRAs do affect firms' decision of whether to export while it has little effect on their decision of how much to export. This may suggest that standards selection could act to raise the compliance costs of some firms (e.g., new entrants) in developing countries relative to other firms (e.g., incumbents) thereby restricting competition (Fischer and Serra, 2000). MRAs appear to reduce such fixed costs to enter export markets. Specifically, our preliminary result shows that the probability of firms in developing countries to export is 52.3 % higher if trading partner countries have such agreements. The effect is more outstanding in agricultural sector; the probability of agricultural firms to export is 75.3% higher with MRAs. This may also suggest that it is considerably difficult for agricultural firms in developing countries to enter new export markets without MRAs.

## **Conclusions**

The review of selected studies outlined here indicates several general conclusions about standards as they relate to trade and development prospects. First, there is

increasing empirical evidence that standards affect international trade, including ability of developing country firms to expand export opportunities. In addition, as noted in the studies which draw on the TBT database, the cost of compliance with multiple technical regulations can be estimated and these costs can be significant. Moreover, there is a continued divergence between national standards and international standards which has consequences in regard to trade flows. Setting standards at more stringent levels than international standards suggests can have an important impact on trade prospects for developing country exporters. Systematic differences between types of standards and differences across sectors need to be further explored and may be possible with data such as that available in the TBT database.

What about directions for future research? Research to date on standards relies primarily on cross-sectional variations at a point in time. In order to obtain more robust and precise results regarding the impact of standards on trade, new research with panel data and dynamic models is needed. The Bank is currently considering, for example, extending the TBT database into a panel dataset. Moreover, new dynamic models should take into account both short-run and long-run cost and benefit from meeting foreign standards.. This framework could also be applied to questions associated with open standards and the information technology sector, for example.

Limited numbers of reliable datasets, which allow for quantifying the impact of technical standards on international trade, are an important impediment for the future studies. The difficulty to collect data is a result of heterogeneity of non-technical barriers to trade among different countries. Also, the collection of the firm level data that will

allow for cost analysis of technical product standards is a prerequisite for the future research in the area. This direction should be a priority for research organizations engaged in economic research and trade.

**Footnotes**

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<sup>1</sup> The terms “standards” and “standards and technical regulations” are used interchangeably throughout this paper. The WTO provides a clear distinction between standards and technical regulations; the former are voluntary and the latter are mandatory technical requirements. In many cases “standards” cover mandatory technical requirements.

<sup>2</sup> This paper surveys the literature on standards-setting processes and their consequences for industry structure and economic welfare. They examined four kinds of standardization processes: (1) market competition involving products embodying non-proprietary standards, (2) market competition among (proprietary) standards, (3) agreements within voluntary standards-writing organizations, and (4) direct governmental promulgation.