



ADB Working Paper Series

**LABELS, FOOD SAFETY,
AND INTERNATIONAL TRADE**

Norbert L. W. Wilson

No. 657
February 2017

Asian Development Bank Institute

Norbert Wilson is a professor at the Friedman School of Nutrition Science and Policy at Tufts University.

The views expressed in this paper are the views of the author and do not necessarily reflect the views or policies of ADBI, ADB, its Board of Directors, or the governments they represent. ADBI does not guarantee the accuracy of the data included in this paper and accepts no responsibility for any consequences of their use. Terminology used may not necessarily be consistent with ADB official terms.

Working papers are subject to formal revision and correction before they are finalized and considered published.

The Working Paper series is a continuation of the formerly named Discussion Paper series; the numbering of the papers continued without interruption or change. ADBI's working papers reflect initial ideas on a topic and are posted online for discussion. ADBI encourages readers to post their comments on the main page for each working paper (given in the citation below). Some working papers may develop into other forms of publication.

Unless otherwise stated, boxes, figures and tables without explicit sources were prepared by the authors.

Suggested citation:

Wilson, N. L. W. 2017. Labels, Food Safety, and International Trade. ADBI Working Paper 657. Tokyo: Asian Development Bank Institute. Available: <https://www.adb.org/publications/labels-food-safety-and-international-trade>

Please contact the author for information about this paper.

Email: Norbert.Wilson@tufts.edu

Norbert Wilson wrote the chapter while a professor in the Department of Agricultural Economics and Rural Sociology at Auburn University, Auburn, AL, United States.

Asian Development Bank Institute
Kasumigaseki Building, 8th Floor
3-2-5 Kasumigaseki, Chiyoda-ku
Tokyo 100-6008, Japan

Tel: +81-3-3593-5500
Fax: +81-3-3593-5571
URL: www.adbi.org
E-mail: info@adbi.org

© 2017 Asian Development Bank Institute

Abstract

Several of the Sustainable Development Goals (SDGs) suggest that improving well-being is achievable through trade. The free flow of goods and services internationally, which encourages efficient production and expansion of consumption, may support SDGs concerning inclusive and sustainable economic growth and sustainable consumption and production patterns. However, trade restrictions such as nontariff barriers (NTBs) may stymie potential gains from trade, which supports the SDGs. This chapter explores the trade effects of different NTBs, especially labeling and food safety regulations in food and agriculture. The upshot of this chapter is that trade can enhance economic growth and development. Standards such as labels and food safety regulations may contribute to or hamper this growth, which affects the capacity to attain the relevant SDGs. Thus, future analysis must provide careful assessments of industries, proposed standards, multiple outcomes, and power relationships to identify the effects of standards on trade and development.

JEL Classification: Q17, Q18, F13, O24

Contents

1.	INTRODUCTION	1
2.	TRADE EFFECTS OF NONTARIFF BARRIERS	1
3.	LABELS AND FOOD SAFETY DEFINED.....	2
4.	WORLD TRADE ORGANIZATION, LABELS, AND FOOD SAFETY	3
5.	THE EVOLUTION OF THE TECHNICAL BARRIERS TO TRADE AGREEMENT AND THE APPLICATION OF SANITARY AND PHYTOSANITARY MEASURES.....	4
6.	PUBLIC STANDARDS	7
7.	PRIVATE STANDARDS.....	8
8.	CONCLUSION.....	9
	REFERENCES	10

1. INTRODUCTION

The economics literature has developed theoretically founded and empirically supported analysis that suggests that international trade is an engine of economic growth globally (Anderson and Martin 2005, Bhagwati and Srinivasan 2002, Dollar and Kraay 2004, Maertens and Swinnen 2009). Further, the analysis makes the point that impediments to free trade are impediments to the predicted growth and welfare benefits. Several of the Sustainable Development Goals (SDGs) suggest that improving well-being is achievable through trade. In particular, SDGs 8 (Promote inclusive and sustainable economic growth, employment, and decent work for all) and 12 (Ensure sustainable consumption and production patterns) can be supported by the free flow of goods and services internationally, which encourages efficient production and expansion of consumption.

2. TRADE EFFECTS OF NONTARIFF BARRIERS

After the signing of the Uruguay Round of the World Trade Organization (WTO), particularly the Agreement on Agriculture, concerns arose that codified globalization would lead to a race to the bottom in terms of safety and environmental concerns (Young 2003). However, Vogel (1995) argues that under certain conditions trade could lead to an improvement (“trading up”) in these areas because of the exchange (cf. Hart 2007; Maertens and Swinnen 2009; Murphy, Levidow, and Carr 2006; Shepherd and Wilson 2013; Swinnen and Vandemoortele 2011; Swinnen et al. 2015; and Young 2003). Further, the economics literature suggests that these standards¹ can enhance trade. Given improvements to consumer welfare, the net effect of standards can be beneficial (Beghin, Disdier, and Marette 2013; Beghin et al. 2013; Disdier and Marette 2010; Swinnen and Vandemoortele 2011; Swinnen et al. 2015; and van Tongeren et al. 2010).

Researchers also express concerns that nontariff barriers (NTBs), such as labels and food safety regulations, which may be used to trade up, would rise and limit trade and limit the welfare-enhancing benefits of freer trade (Henson 2007, Henson, Masakure and Cranfield 2011; Wilson and Anton 2006). In particular, the thought has been that these NTBs would limit developed countries and, in some instances, lead to even greater harm for exports of developing countries compared with developed countries (Otsuki, Wilson, and Sewadeh 2001a; Otsuki, Wilson, and Sewadeh 2001b; cf. Shepherd and Wilson 2013; Tran, Wilson, and Anders 2012; Tran, Nguyen and Wilson 2014). A challenge of these regulations centers on the question of when these policies are implemented to protect domestic producers or to enhance trade. Further, if the intent of the policies is appropriate, differences in perspective of expectations of quality, safety, and risk tolerance shape what level of information, ethical concern, or food safety requirements is appropriate between countries. However, Swinnen et al. (2015) suggest that the intent of the policy may not matter; rather, the context of the standards (political factors, producer costs, consumer demand conditions, etc.) may shape the effect of the standard more. Given that the SDGs are achievable, the potential negative effects of labeling and food safety regulations, as with other NTBs, would need managing so as not to limit trade in a distortionary fashion. In this chapter, I will lay out the effects of labels and food safety regulations on international trade, especially for developing countries.

¹ I use the terms “standards” and “regulations” interchangeably in this chapter. However, in some texts authors may use the term “standard” to suggest a voluntary rule and a “regulation” as obligatory.

A *prima facie* argument is that the intent of the regulation (food safety, consumer information, protectionism, etc.) does not matter for regulations that limit the ability of developing countries to trade. Regardless of the validity of the reason for standards and the beneficiaries, trade policies that limit the ability of producers in developing countries to benefit from trade lower growth and development of the exporting countries, particularly exporters in a developing country. Over time, however, the intent of the regulation can matter. Food safety regulations, created to prevent the trade of products with pathogens or excessive chemical residues will shore up markets and potentially enhance the demand for the product or enhance welfare. Multiple researchers make the case that a food safety standard can lead to more stringent standards, but other factors can affect the outcome such as the preferences of consumers of risk (Beghin et al. 2013, Disdier and Marette 2010, Fulponi 2006, Henson 2007, Swinnen et al. 2015, and van Tongeren et al. 2010). Similarly, a label that reflects production practices that are consistent with consumer values or ideas concerning organics or animal welfare may also support consumption of the product and yield premiums for the producers. Further, these policies can enhance the productive capacities of the developing country producers by rationalizing production, enhancing efficiencies or contributing to producer welfare. In these cases, we see “win-win” regulations—consumers, not just those in developed countries, obtain their consumption goals, and producers in exporting countries attain the economic benefit of selling products in valuable global markets.

Beyond the idea of trading up and win-win regulations, much of the analysis in trade and development literature have tended to look at regulations imposed by governments as either beneficial to the consumers in the importing country or harmful to the producers in the exporting country. However, tertiary literature suggests that the effects depend on a number of mitigating factors. Further, a burgeoning literature on private standards follows a similar pattern. Thus, a critical assessment of the regulatory environment may prompt a careful weighting of the goals of regulations in light of the efforts to use trade as a means to achieve the SDGs.

3. LABELS AND FOOD SAFETY DEFINED

To begin this discussion, the parameters for this chapter of labels and food safety need explanation. Jansen and de Faria (2002) argue that labels fall into one of two functional areas: (i) to give information on aspects of the product, and (ii) to provide a minimum standard of quality of the product. An example of information labels is consumer-facing labels that indicate the nutrients and ingredients in a product. These labels are usually incontrovertible and required. Following the second label type, a product is (or is not) organic, dolphin safe, ecologically friendly, etc. by the presence (or lack) of the label. The presence of these labels may reflect gradients of compliance or adherence. For example, organic labeling in the United States indicates “100% organic,” “organic,” or “Made with organic [a named specific ingredient]” (USDA Agricultural Marketing Service 2016). Typically, though, these quality labels are binary: the product is certified “Rainforest Alliance” or not. These quality labels may not be required, but the presence of these labels suggests a range of qualities in the marketplace.

Safety, in the realm of food, is not readily detectable to the consumer. As a credence trait, consumers assume the safety of the product, and that assumption rests upon the regulatory institutions within and between countries. The safety of the product is often determined through science. However, the societies often observe the science of food safety through the cultural lens of the permissible levels of risk and uncertainty, as seen in the case of genetically modified organisms globally. Food safety and labeling

often do not intersect because products have labels, which state that one product is safe and another is unsafe. The case of genetically modified products is one where the lines of safety, quality, and consumers' right to know begin to blur.

In cases like these, controversies abound, but as suggested earlier, nations have a cultural understanding of safety and the extent of acceptable safety. Similarly, different consumers demand differing levels of production methods, desired qualities based on values, even the requisite amount of information, as seen with labels. These differences and the attendant ambiguity of the means and motivations for safety and information lead to conflicts in international trade. The lack of careful consideration and transnational dialogue can limit the ability of countries to gain the most from international trade.

4. WORLD TRADE ORGANIZATION, LABELS, AND FOOD SAFETY

Under the WTO, the Agreement on Technical Barriers to Trade (TBT Agreement) and the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement) are the two mechanisms that provide the rules for nations to implement labels and food safety regulations in trade. Before these agreements, the General Agreement on Tariffs and Trade (GATT) had limited scope to address issues related to labels. Article XI indicates that limits to most favored nations are possible for traded goods to follow standards and regulations. Article XX b states that measures are permissible to protect the health and life of humans, animals, and plants as long as the measures are not veiled attempts of protectionism. At the end of the Tokyo Round in 1979, GATT member countries agreed to the TBT Agreement, which established principles to guide the implementation of labels and other trade restrictions for the protection of health and life and the broader environment (Wilson 2003). Member countries revised the TBT Agreement at the end of the Uruguay Round in 1994.

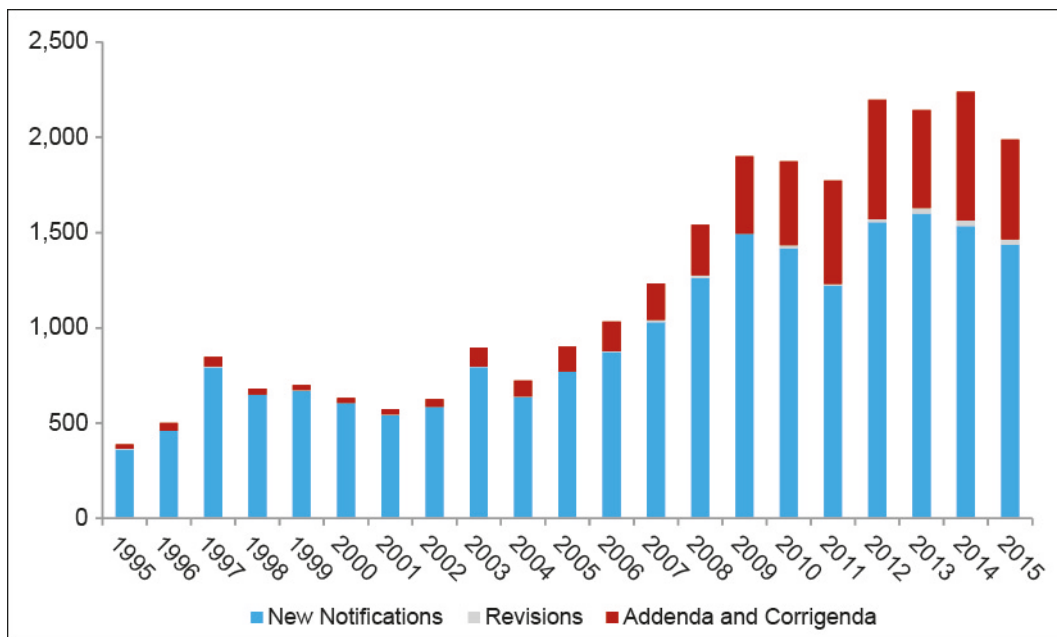
The advent of the SPS Agreement coincides with the Agreement on Agriculture at the conclusion of the 1994 Uruguay Round. The SPS Agreement builds on Article XX b of the GATT and the TBT Agreement by addressing specifically protection of humans and animals from food-borne illness and other harmful substances found in food or feed. Further, the SPS Agreement extends protection from the spread of disease, pests, or organisms that could spread such diseases or pests. Based on the science of risk assessment, nations have the freedom "to provide the level of health protection it deems appropriate, but to ensure that these sovereign rights are not misused for protectionist purposes and do not result in unnecessary barriers to trade" (World Trade Organization 1998).

To help promote trade, the TBT and SPS share some common principles of harmonization, equivalence, and transparency. Harmonization is to encourage nations to adopt internationally common standards. To this effect, the agreements recognize explicitly international standard setting organizations such as Codex Alimentarius for food safety; International Office of Epizootics for animal health; International Plant Protection Convention for plant health; and International Organization of Standards for standards across all products. Equivalence is the recognition that different policies may achieve the same outcome; thus, trading partners should recognize and accept each other's regulations. Transparency encourages nations to notify new policies and to allow for public review of the policies.

5. THE EVOLUTION OF THE TECHNICAL BARRIERS TO TRADE AGREEMENT AND THE APPLICATION OF SANITARY AND PHYTOSANITARY MEASURES

These principles should help nations overcome the trade restrictiveness of NTBs. Of the principles that can be observed, the number of notifications reported over time and by country type can serve as a proxy measure of transparency. As seen in Figure 1, the number of TBT notifications increased from nearly 500 in 1995 to over 2000 in 2014. This fourfold increase may be a sign of greater protectionism. Walkenhorst (2003), however, argues that increases in the number of notifications may reflect an increase in trade or increased awareness by countries of the importance of transparency. The process of notifying new and revised TBTs encourages discussion of the proposed TBTs and gives trade partners the opportunity to discuss and potentially encourage the adjustment of the TBTs.

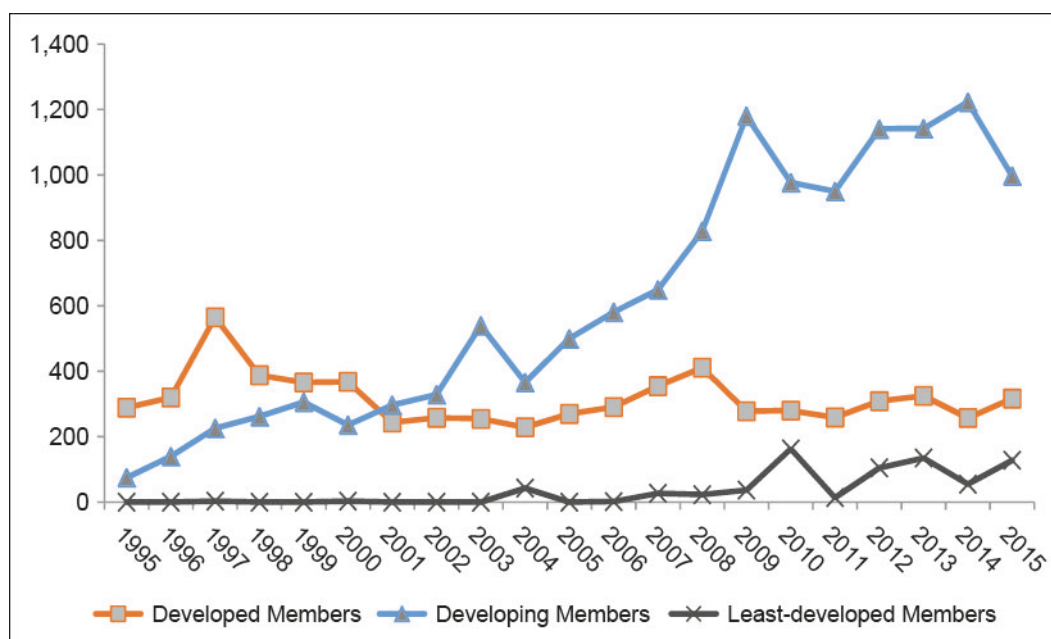
Figure 1: Total Technical Barriers to Trade Notifications, 1995–2015



Source: World Trade Organization (2016).

As seen in Figure 2, developed countries made the most notifications from 1995 to 2000. After that period, developing countries notified over three times as many TBT notifications as developed countries. Developed countries kept a steady flow of notifications, at around 200 notifications a year. Least-developed members of the WTO have been slow to contribute to the notifications. The great expansion of notifications by developing countries suggests a counter-narrative to the one of developed countries imposing NTBs on developing countries. However, from 1995 to 2015, the top-five notifying countries in order are the United States, Brazil, the European Union, the People’s Republic of China, and Israel (World Trade Organization 2016). Of course, these data only reflect those countries that notify. Underreporting is possible. Nevertheless, the implication of these data is that, on a per country basis, developed countries generate the largest number of new TBTs, and the large number of developing countries, which provide fewer TBT notifications per country, is the reason for the substantial increase in TBTs.

Figure 2: New Notifications by Development Status, 1995–2015



Source: World Trade Organization (2016).

Another important measure of the effects of TBTs on trade is the number of disputes initiated at the WTO. As seen in Table 1, in the first half of the data set, countries brought 33 cases before the Dispute Settlement Panel. That number fell by 42.4% in the second half of the data set. The high number of disputes brought in the first half could be the result of the revision of the TBT Agreement in 1994, and nations perceived that they had stronger grounds to bring a case against another WTO member. Another explanation is that member countries have resolved many core differences, and the principle of transparency has improved communication so that fewer disputes occurred. In support of this point is the decline in the number of disputes. That decline coupled with the increase in the number of notifications suggests that the transparency and dialogue may have lowered possible conflicts from TBTs.

Table 1: Technical Barriers to Trade and Sanitary and Phytosanitary Disputes Raised at the World Trade Organization

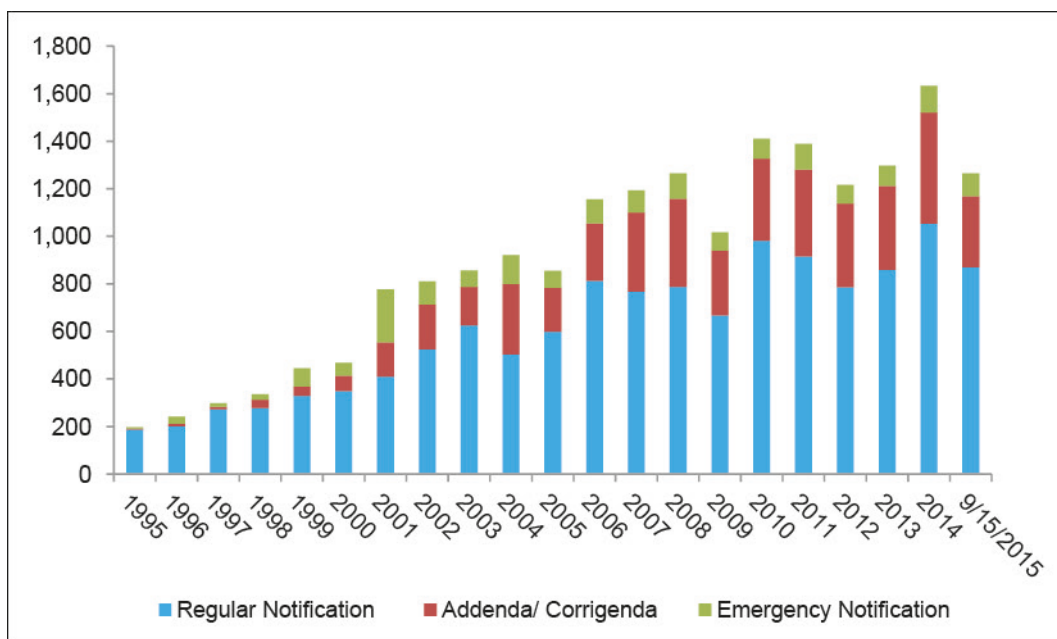
Dispute	Year	Number of Disputes Raised	Developing Country Complainant and Developing Country Respondent	Developing Country Complainant and Developing Country Respondent	Developed Country Complainant and Developing Country Respondent	Developed Country Complainant and Developed Country Respondent
			Number	Number	%	Number
TBT	1995–2005	33	6.06	27.27	24.24	42.42
	2006–2016	19	21.05	47.37	5.26	26.32
SPS	1995–2005	30	10.00	16.67	23.33	50.00
	2006–2016	14	14.29	35.71	28.57	21.43

SPS = sanitary and phytosanitary, TBT = technical barriers to trade.

An important change occurred in the relative share of disputes brought before the Dispute Settlement Panel from developing countries as compared with developed countries. From 1995 to 2005, developing countries brought nearly 33% of the TBT disputes, and developed countries brought nearly 66% of the disputes. This relationship inverted in the second half of the data. From 2006 to 2016, developing countries brought over 68% of TBT disputes, and developed countries brought only 32% of the disputes. The reversal in relative shares suggests that initially developed countries used the mechanism to address long-standing conflicts. The increase in the share of developing countries bringing disputes suggests a shift in focus of developing countries and commitment to address challenges that they faced particularly from developed countries. These findings suggest that the WTO created a path for countries to identify and resolve TBT issues. While TBT issues such as labels have not disappeared, the facility in the WTO to discuss and resolve trade conflicts may have been beneficial for member states.

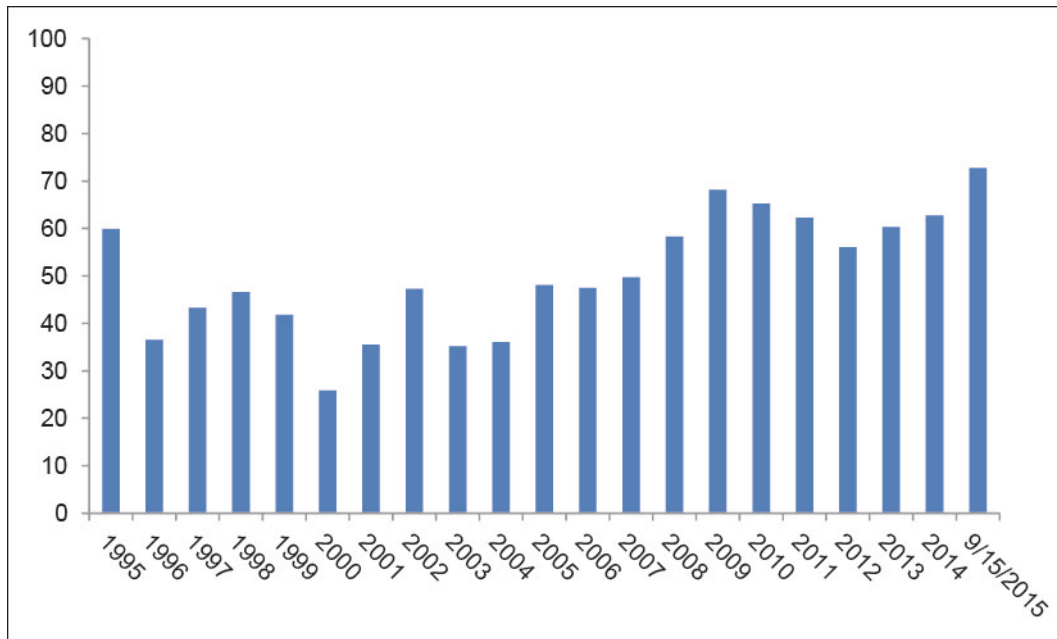
The evolution of SPS is similar to TBT. Since its inception, the number of SPS notifications increased from 200 in 1995 to over 1,600 in 2014 (see Figure 3). Beginning in 2008, developing countries contributed over 50% of SPS notifications (see Figure 4). Similar to the TBT notifications, the increase in SPS notifications is associated with a decline in the number of SPS disputes from 1995–2005 to 2006–2016. Thus, WTO members may not find the new SPS regulations overly burdensome. The relative share of SPS disputes increased for developing countries from 26% to nearly 50%. These findings suggest that SPS and TBT regulations are not growing in restrictiveness and potentially are weakening. The concern that developed countries are using mechanisms such as the TBT and SPS agreements as tools of protectionism against developing countries does not seem to hold. Collectively, the previously discussed standards that fall under the aegis of the SPS and the TBT agreements are public standards as national governments create and enforce these standards.

Figure 3: Notifications Submitted per Year



Source: World Trade Organization (2015).

Figure 4: Share of Total Notifications Submitted by Developing Country Members (including Least-Developed Countries) (%)



Source: World Trade Organization (2015).

6. PUBLIC STANDARDS

A number of studies have suggested that these public standards may have a negative effect on trade. Two of the earliest studies of the effects of regulations, specifically food safety, on developing countries center on peanuts and aflatoxin (Otsuki, Wilson, and Sewadeh 2001a; Otsuki, Wilson, and Sewadeh 2001b). This literature prompted a number of studies that use a similar method—the gravity model² (Czubala, Shepherd and Wilson 2009; Disdier, Fontagne, and Mimouni 2008; Disdier and Fontagne 2009; Disdier and Marette 2010; Drogue and DeMaria 2012; Shepherd 2007; Shepherd and Wilson 2013; Tran, Wilson and Anders 2012; Tran, Nguyen, and Wilson 2014; Wieck, Schluter, and Britz 2012; Wilson and Otsuki 2003; and Xiong and Beghin 2014, among others). Much of this literature suggests that rising standards lower the value of trade, and that developing countries, in particular, are hurt by these standards. However, the later literature began to question the negative effect of standards. In particular, researchers using new techniques to address zero trade, distinguish between intensive and extensive margins, and address other technical issues (Helpman, Melitz, and Rubinstein 2008; Santos Silva and Tenreyro 2006). The findings based on the new techniques began to show that new standards may have positive or no effect (Shepherd and Wilson 2013, Xiong and Beghin 2014) or that even if standards have negative effects the overall effect in terms of welfare could be positive (Disdier and Marette 2010). Further, researchers found evidence that some countries were able to use the SPS regulations as a competitive tool and a way to reap the higher returns associated with safer products (Henson and Jaffee 2008; Neeliah, Neeliah, and Goburdhun 2013).

² Some of these papers assess the effects of public and private standards, which I discuss in the next section.

7. PRIVATE STANDARDS

Concern has grown in the literature and policy circles of the presence of private standards, such as those created by retailers like the British Retail Consortium and EurepGAP, which became GlobalGAP (Good Agricultural Practices), and civil society organizations such as Marine Stewardship Council, among others. Fulponi (2006) argues that private groups are leading forces shaping international standards on food ethics, quality, and safety. Many researchers suggest that the standards from private groups can be more stringent than the standards that the national governments set (Fulponi 2006, Henson 2007, Henson and Jaffee 2008, Swinnen et al. 2015). The reason for the increased stringency is to establish or extend the reputation of the firms to gain a competitive edge over other firms (Fulponi 2006, Swinnen et al. 2015).

With the higher standards, producers face higher compliance costs. As a result, researchers have suggested that private standards may create market distortions and leave small-scale producers in developing countries out of profitable markets. If the standards ultimately encourage cost reductions managed through economies of scale, they can favor larger exporters and producers (Henson 2007, Tran et al. 2013). Thus, these smaller firms may exit the supply chain; however, the private standards may make incentive improvements in production practices (Fulponi 2006, Swinnen et al. 2015). During the development of this literature, Henson (2007) suggested the need for empirical research of the effects of private standard.

As noted by Minten et al. (2009) and Maertens and Swinnen (2009), a number of studies suggested that development of local and international retail markets may harm small-scale producers (Delgado 1999, Key and Runsten 1999, Kirsten and Sartorius 2002, Minot and Ngigi 2010, Reardon and Swinnen 2004, Reardon et al. 2003, Weatherspoon and Reardon 2003). However, a body of literature based on a series of empirical case studies, begin to show that the private standards are not harmful but may contribute to the development process.

From household level surveys of nearly 10,000 vegetable farmers in Madagascar, Minten et al. (2009) provide evidence that private standards improved the well-being of participating farmers. Under the contracts with Europe-based supermarkets, farmers had to meet a complex set of quality and phytosanitary standards. In the analysis, researchers found that farmers had higher welfare, more stable incomes, and shorter lean times. Further, these farmers gained from the contracts via technology spillovers and better resource management. Maertens and Swinnen (2009) and, in a follow-up paper, Colen et al. (2012) critique the literature of the time for failing to evaluate the effects of high-standard trade on poverty and welfare. Evaluating a group of vegetable farmers in Senegal, Maertens and Swinnen (2009) find that participating in contracts that required adherence to marketing standards, SPS measures, hygiene standards, and traceability standards, these farmers increased exports and experienced higher wages. Through simulations, they show that poverty would decline. Colen et al. (2012) evaluated the effect of the participation of Senegal's farmers in GlobalGAP. They also find increased wages and longer contracts for poor household members. In both studies, they find that the structure of production changed: a movement from smallholder farmers to large, more industrial plantations, which is a concern raised in the earlier literature.

Henson (2007) acknowledges the restructuring of production that standards could prompt. However, Colen, Maertens, and Swinnen (2012) and Maertens and Swinnen (2009) suggest that the movement away from smallholder production to hired labor on larger industrial farms is part of the gains for producers. As standards evolve and

markets change, will these new relationships hold into the future? Another area of concern centers on who has voice and power in the global value chains under standards. Bergleiter and Meisch (2015) suggest that shared values between consumers and producers can lower the costs of standard setting and implementation. Bush and Oosterveer (2015) assert that private standards, for example, from the Marine Stewardship Council, not only affect markets and trade, but they may alter the relationship of the actors in the value chain. These dynamics may alter the standard, which ultimately affects producers and consumers. Similarly, Ponte (2008) suggests that politics and local conditions may mediate standard setting and implementation beyond the dictates of science. The importance of who has voice and power in the value chain for setting and control standards rests on the fact that these private standards are outside of the political process. Producers have no recourse for addressing concerns about private standards, as is the case for public standards. To this point, Henson (2007) asks, "Should public authorities concede the governance of global supply chains to private standards or attempt to rein these in?"

8. CONCLUSION

Standards have an effect on trade. The evolution of literature suggests an ever changing perception of what these standards are and the consequences of labels and food safety guidelines. Early in the implementation of standards, national governments were the main actors and contributors to these standards. Member countries of the WTO had the ability to raise the issue of the appropriateness of these standards. However, a new wave of standards has moved the rule setting out of the hands of governments, effectively out of the WTO, and into the hands of private firms and nongovernment organizations. This second wave of standards calls into question who has the ability to effect change in the value chain and the standards that intervene in the value chains.

One interpretation of the literature and policy discussion around standards is that standards will interrupt trade and harm producers and exporters in developing countries. Much of the early evidence from the empirical trade literature provides support that the standards lower trade values. Nevertheless, a new literature finds mixed results, suggesting that standards may have no effect on or even increase trade. Further, the development literature provides evidence from case studies that standards are contributing to economic growth. In contrast, the literature on global value chains calls into question not the trade effects of the standards in the short run; rather, the literature critiques the power relationships between actors along the value chain with implications that these relationships may shape future development and consumer well-being.

The upshot of this chapter is that trade can enhance economic growth and development. Standards, such as labels and food safety regulations, may contribute to or hamper this growth, which affects the capacity to attain the relevant SDGs as no consensus holds for the effects of standards. Part of the reason for the differences in the evaluation is differences in methods, products under consideration, countries evaluated, and outcome measures. Despite these differences and the limited scope for generalizations or direct comparisons, this literature does provide a frame to evaluate the effects of standards on the development process. Thus, future analysts and governments can do precise evaluation of industries, standards under review, outcome measures, and power relationships to determine the effects of standards on trade and development.

REFERENCES

- Anderson, K. and W. Martin. 2005. Agricultural Trade Reform and the Doha Development Agenda. *World Economy* 28(9): 1301–27.
- Beghin, J. C., A-C. Disdier, and S. Marette. 2013. The Economics and Potential Protectionism of Food Safety Standards and Inspections: An Application to the U.S. Shrimp Market. In *Nontariff Measures with Market Imperfections: Trade and Welfare Implications*, edited by J. C. Beghin. Bingley. UK: Emerald.
- Beghin, J. C., A-C. Disdier, S. Marette, and F. van Tongeren. 2013. A Cost Benefit Approach for the Assessment of Nontariff Measures in International Trade. In *Non-Tariff Measures with Market Imperfections: Trade and Welfare Implications, The Frontiers of Economics and Globalization*, edited by J. Beghin. Bingley. UK: Emerald Group Publishing Limited.
- Bergleiter, S. and S. Meisch. 2015. Certification Standards for Aquaculture Products: Bringing Together the Values of Producers and Consumers in Globalised Organic Food Markets. *Journal of Agricultural & Environmental Ethics* 28(3): 553–69. doi: 10.1007/s10806-015-9531-5.
- Bhagwati, J. N. and T. N. Srinivasan. 2002. Trade and Poverty in the Poor Countries. *American Economic Review* 92(2): 180–83.
- Bush, S. R. and P. Oosterveer. 2015. Vertically Differentiating Environmental Standards: The Case of the Marine Stewardship Council. *Sustainability* 7(2): 1861–83. doi: 10.3390/su7021861.
- Colen, L., M. Maertens, and J. Swinnen. 2012. Private Standards, Trade and Poverty: Globalgap and Horticultural Employment in Senegal. *World Economy* 35(8):1073–88.
- Czubala, W., B. Shepherd, and J. S. Wilson. 2009. Help or Hindrance? The Impact of Harmonised Standards on African Exports. *Journal of African Economies* 18(5): 711–44.
- Delgado, C. L. 1999. Sources of Growth in Smallholder Agriculture in Sub-Saharan Africa: The Role of Vertical Integration of Smallholders with Processors and Marketers of High Value-Added Items. *Agrekon* 38(Special May): 165–89.
- Disdier, A-C. and L. Fontagne. 2009. Trade Impact of European Measures on Gmos Condemned by the WTO Panel. CEPII Research Center, Working Papers.
- Disdier, A-C. and S. Marette. 2010. The Combination of Gravity and Welfare Approaches for Evaluating Nontariff Measures. *American Journal of Agricultural Economics* 92(3): 713–26.
- Disdier, A-C., L. Fontagne, and M. Mimouni. 2008. The Impact of Regulations on Agricultural Trade: Evidence from the SPS and TBT Agreements. *American Journal of Agricultural Economics* 90(2): 336–50.
- Dollar, D. and A. Kraay. 2004. Trade, Growth, and Poverty. *Economic Journal* 114(493): F22-49.
- Drogue, S. and F. DeMaria. 2012. Pesticide Residues and Trade, the Apple of Discord?. *Food Policy* 37(6): 641–49.
- Fulponi, L. 2006. Private Voluntary Standards in the Food System: The Perspective of Major Food Retailers in Oecd Countries. *Food Policy* 31(1): 1–13.

- Hart, M. 2007. Trading Up: The Prospect of Greater Regulatory Convergence in North America. Vol. *Estudios y Perspectivas*. International Trade and Industry Unit México, D. F.: Sede Subregional de la CEPAL en México.
- Helpman, E., M. Melitz, and Y. Rubinstein. 2008. Estimating Trade Flows: Trading Partners and Trading Volumes. *The Quarterly Journal of Economics* 73(2): 441–87.
- Henson, S. 2007. The Role of Public and Private Standards in Regulating International Food Markets. *Journal of International Agricultural Trade and Development* 4(1): 63–81.
- Henson, S. and S. Jaffee. 2008. Understanding Developing Country Strategic Responses to the Enhancement of Food Safety Standards. *World Economy* 31(4): 548–68.
- Henson, S., O. Masakure, and J. Cranfield. 2011. Do Fresh Produce Exporters in Sub-Saharan Africa Benefit from Globalgap Certification?. *World Development* 39(3): 375–86.
- Jansen, M. and A. L. de Faria. 2002. Product Labeling, Quality and International Trade Vol. 2002–01. Geneva: World Trade Organization.
- Key, N. and D. Runsten. 1999. Contract Farming, Smallholders, and Rural Development in Latin America: The Organization of Agroprocessing Firms and the Scale of Outgrower Production. *World Development (Oxford)* 27(2): 381–401.
- Kirsten, J. and K. Sartorius. 2002. Linking Agribusiness and Small-Scale Farmers in Developing Countries: Is There a New Role for Contract Farming?. *Development Southern Africa* 19(4): 503–29. doi: 10.1080/0376835022000019428.
- Maertens, M. and J. F. M. Swinnen. 2009. Trade, Standards, and Poverty: Evidence from Senegal. *World Development* 37(1): 161–78.
- Minot, N. and M. Ngigi. 2010. Are Horticultural Exports a Replicable Success Story? Evidence from Kenya and Cote D'ivoire. In *Successes in African Agriculture: Lessons for the Future*, edited by S. Haggblade and P. B. R. Hazell: Published for the International Food Policy Research Institute. Baltimore: Johns Hopkins University Press.
- Minten, B., L. Randrianarison, and J. F. M. Swinnen. 2009. Global Retail Chains and Poor Farmers: Evidence from Madagascar. *World Development* 37(11): 1728–41. <http://dx.doi.org/10.1016/j.worlddev.2008.08.024> (accessed 30 January 2017).
- Murphy, J., L. Levidow, and S. Carr. 2006. Regulatory Standards for Environmental Risks: Understanding the US–European Union Conflict over Genetically Modified Crops. *Social Studies of Science* 36(1): 133–60. doi: 10.1177/0306312705054591.
- Neeliah, S. A., H. Neeliah, and D. Goburdhun. 2013. Assessing the Relevance of EU SPS Measures to the Food Export Sector: Evidence from a Developing Agro-Food Exporting Country. *Food Policy* 41: 53–62.
- Otsuki, T., J. S. Wilson, and M. Sewadeh. 2001a. What Price Precaution? European Harmonisation of Aflatoxin Regulations and African Groundnut Exports. *European Review of Agricultural Economics* 28(3): 263–83.

- . 2001b. Saving Two in a Billion: Quantifying the Trade Effect of European Food Safety Standards on African Exports. *Food Policy* 26(5): 495–514.
- Ponte, S. 2008. Greener Than Thou: The Political Economy of Fish Ecolabeling and Its Local Manifestations in South Africa. *World Development* 36(1): 159–75. doi: 10.1016/j.worlddev.2007.02.014.
- Reardon, T. and J. F. M. Swinnen. 2004. Agrifood Sector Liberalisation and the Rise of Supermarkets in Former State-Controlled Economies: A Comparative Overview. *Development Policy Review* 22(5): 515–23. doi: 10.1111/j.1467-7679.2004.00263.x.
- Reardon, T., C. P. Timmer, C. B. Barrett, and J. Berdegue. 2003. The Rise of Supermarkets in Africa, Asia, and Latin America. *American Journal of Agricultural Economics* 85(5): 1140–46.
- Santos Silva, J. M. C. and S. Tenreyro. 2006. The Log of Gravity. *Review of Economics and Statistics* 88(4): 641–58.
- Shepherd, B. 2007. Product Standards, Harmonization, and Trade: Evidence from the Extensive Margin. *Policy Research Working Paper*. Washington, DC: World Bank.
- Shepherd, B. and N. L. W. Wilson. 2013. Product Standards and Developing Country Agricultural Exports: The Case of the European Union. *Food Policy* 42(0): 1–10.
- Swinnen, J. F. M. and T. Vandemoortele. 2011. Trade and the Political Economy of Food Standards. *Journal of Agricultural Economics* 62(2): 259–80. doi: 10.1111/j.1477-9552.2011.00294.x.
- Swinnen, J., K. Deconinck, T. Vandemoortele, and A. Vandeplass. 2015. *Quality Standards, Value Chains, and International Development: Economic and Political Theory*. Cambridge, UK: Cambridge University Press.
- Tran, N., A. Nguyen, and N. L. W. Wilson. 2014. The Differential Effects of Food Safety Regulations on Animal Products Trade: The Case of Crustacean Product Trade. *Agribusiness* 30(1): 31–45.
- Tran, N., C. Bailey, N. Wilson, and M. Phillips. 2013. Governance of Global Value Chains in Response to Food Safety and Certification Standards: The Case of Shrimp from Vietnam. *World Development* 45: 325–36.
- Tran, N., N. L. W. Wilson, and S. Anders. 2012. Standard Harmonization as Chasing Zero (Tolerance Limits): The Impact of Veterinary Drug Residue Standards on Crustacean Imports in the EU, Japan, and North America. *American Journal of Agricultural Economics* 94(2): 496–502.
- USDA Agricultural Marketing Service. 2016. Organic Labeling Standards. Washington, DC. <https://www.ams.usda.gov/grades-standards/organic-labeling-standards> (accessed 28 July 2016).
- van Tongeren, F., A-C. Disdier, J. Komorowska, S. Marette, and M. von Lampe. 2010. Case Studies of Costs and Benefits of Non-Tariff Measures: Cheese, Shrimp and Flowers. OECD, Directorate for Food, Agriculture and Fisheries, OECD Food, Agriculture and Fisheries Working Papers: 28.
- Vogel, D. 1995. *Trading Up: Consumer and Environmental Regulation in a Global Economy*. Cambridge, MA: Harvard University Press.

- Walkenhorst, P. 2003. Implementation of the Tbt and SPS Agreements. In *The Impact of Regulations on Agro-Food Trade: The Technical Barriers to Trade (Tbt) and Sanitary and Phytosanitary Measures (SPS) Agreement*, edited by W. Jones and P. Walkenhorst. Paris: Organisation for Economic Co-operation and Development.
- Weatherspoon, D. D. and T. Reardon. 2003. The Rise of Supermarkets in Africa: Implications for Agrifood Systems and the Rural Poor. *Development Policy Review* 21(3): 333–56.
- Wieck, C., S. W. Schluter, and W. Britz. 2012. Assessment of the Impact of Avian Influenza-Related Regulatory Policies on Poultry Meat Trade and Welfare. *World Economy* 35(8): 1037–52.
- Wilson, J. S. and T. Otsuki. 2003. Food Safety and Trade: Winners and Losers in a Non-Harmonized World. *Journal of Economic Integration* 18(2): 266–87.
- Wilson, N. L. W. 2003. Clarifying the Alphabet Soup of the Tbt and the SPS in the WTO. *Drake Journal of Agricultural Law* 8: 703.
- Wilson, N. L. W. and J. Anton. 2006. Combining Risk Assessment and Economics in Managing a Sanitary-Phytosanitary Risk. *American Journal of Agricultural Economics* 88(1): 194–202.
- World Trade Organization. 1998. Understanding the WTO Agreement on Sanitary and Phytosanitary Measures. *Sanitary and Phytosanitary Measures: Introduction*. Geneva. https://www.wto.org/english/tratop_e/sps_e/spsund_e.htm (accessed 10 September 2003).
- . 2015. *Overview Regarding the Level of Implementation of the Transparency Provisions of the SPS Agreement Revision* Congress. G/SPS/GEN/804/Rev. 8.
- . 2016. *Twenty-First Annual Review of the Implementation and Operation of the Tbt Agreement: Note by the Secretariat Revision* Congress. G/TBT/38/Rev.1.
- Xiong, B. and J. Beghin. 2014. Disentangling Demand-Enhancing and Trade-Cost Effects of Maximum Residue Regulations. *Economic Inquiry* 52(3): 1190–203.
- Young, A. R. 2003. Political Transfer and "Trading Up"? Transatlantic Trade in Genetically Modified Food and U.S. Politics. *World Politics* 55(4): 457–84.