Non-Tariff Measures – A Fresh Look at Trade Policy's New Frontier

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edited by **Olivier Cadot and Mariem Malouche**

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OLIVIER CADOT AND MARIEM MALOUCHE

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Foreword

Governments continue to be subject to pressures to assist domestic firms and industries, especially when times are bad as they are today. And incentives to use traditional trade policies such as tariffs and quotas have changed and that other types of non-tariff policies – such as subsidies and standards– have become more attractive. Starting in the mid-1980s, average levels of tariff protection in both industrialised and developing countries were gradually lowered. As of 2012, the average level of import protection has dropped to 10% or less in many developing countries, and the average uniform tariff equivalent of merchandise trade policies in OECD countries is now less than 4%. Imports of many manufactures are now duty-free. Higher rates of tariff protection continue to prevail for many agricultural products, but overall trade policies around the world are dramatically less restrictive than they were in 1980. The 'supply response' to the liberalisation of trade has been enormous, with the value of global trade expanding more than ten-fold, and foreign direct investment flows growing even more, in part the result – and the driver – of the ever increasing fragmentation of production and the geographic splintering of supply chains. One result of the change in the structure of global production has been to encourage further reduction in import tariffs, as any tariff that is imposed on any part of the supply chain increases the cost of the final product and thus is detrimental to all the links in any given chain.

While changes in the structure of global trade and production have implications for the political economy of trade policy choices, analysis of these possible impacts requires access to information on the prevalence and incidence of non-tariff measures affecting trade. The availability of such information is rather patchy. One lesson that has emerged from the Global Trade Alert trade policy monitoring exercise is that it is a priority to invest greater effort in the collection of such data. Another lesson is that it is difficult – but important – to determine the impacts of non-tariff measures (NTMs), whether or not they are intended to have a discriminatory effect on foreign suppliers of goods and services. In practice, many of the NTMs that are imposed by governments have a regulatory objective of one kind or another—safeguarding human health, plant safety, national security, consumer protection, and so forth. Such objectives are all legitimate reasons for government intervention – from a trade perspective the challenge is to identify how they can be pursued in a way that minimises adverse effects on the ability of foreign providers of goods and services to contest the market.

Some NTMs—for instance, import or export licenses, permits and quotas—complement or substitute for tariffs in regulating trade flows. Many others have primarily non-trade objectives such as the protection of public health or the environment, but affect the costs of crossing borders through the associated procedural requirements. Countries also often maintain different standards

for similar products, increasing the cost of compliance of exporters. Trade and investment in services activities is likewise affected by numerous regulations, many of which are essentially domestic in aim, but others are discriminatory by design. Reducing the costs associated with regulations affecting the cross-border movement of goods and services is a key part of any trade facilitation agenda. Similarly, a major dimension of efforts to pursue greater economic integration of markets revolves around actions to reduce the trade-impeding effects of NTMs.

   The contributions to this volume analyse new NTM data that has been collected in recent years by a number of international organisations working together, and new databases on standards as well as on import refusals. In the overview section, the editors point out how these contributions highlight the complex interplay between regulatory design, market structure and political economy that characterise NTMs; they also describe the importance and difficulties, in terms of policy formulation, associated with accurate cost-benefit analysis. We very much support their hope that the contributions in this book will be of benefit for both academics and policymakers in contributing towards improving our collective understanding of the trade effects of NTMs, so as to allow more accurate and solid cost-benefit analysis.

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Overview

OLIVIER CADOT AND MARIEM MALOUCHE

A troubling phenomenon is occurring in developed and large, emerging economies: governments, skittish about global economic trends, are introducing new regulations to limit imports and exports. Recent World Bank analysis (Hoekman *et al*, 2011) documents a trend of creeping protectionism in countries as diverse as Argentina, Brazil and Indonesia. Instead of tariffs, other, more indirect policies are used to hinder imports. The World Bank's analysis, based on World Trade Organization (WTO) monitoring reports and data from the Global Trade Alert, a network of think tanks around the globe, shows a rising trend in the number of non-tariff barriers (NTBs) in the first two years post-2008 followed by a sharp spike in 2011. India, China, Indonesia, Argentina, Russia and Brazil together accounted for almost half of all the new NTBs imposed by countries worldwide, with the EU and US accounting for the remainder.

The measures take various forms. In December 2011, amid a political shake-up, Indonesia announced its intention to apply new technical regulations on imported agricultural products, a move widely interpreted in the press as signalling a tougher stance on imports. The same month, Argentina tightened technical requirements on imports and gave officials increased discretion in determining who was allowed to import. Brazil introduced new import licensing requirements for car parts and other goods competing with domestic industry. These moves are clearly aimed at restricting imports while attempting to remain within WTO and regional commitments, with regulatory measures playing – sometimes inefficiently – the role that tariffs might have played in the absence of multilateral and regional disciplines.[1]

These examples highlight that, although the global financial crisis has not triggered, as some feared, an explosion of protectionist measures, we are not out of the woods yet. After all, it took 20 years for a more fragile world trading

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[1]   In the words of Robert Baldwin (1970), '[t]he lowering of tariffs has, in effect, been like draining a swamp. The lower water level has revealed all the snags and stumps of nontariff barriers that still have to be cleared away' (cited in Costinot, 2008). For a recent discussion of the policy substitution hypothesis in the context of large-country terms-of-trade motives for tariffs and regulations, see Staiger and Sykes (2009). See Limao and Tovar (2011) for an exploration in the case of Turkey.

system to unravel after the crash of 1973.[2] Were protectionism to creep back, NTBs might play a central role because of their high obfuscation power and the fact that, in spite of decades of progress, the disciplines to which they are subjected are still imperfect.[3]

While NTBs are, by definition, protectionist by intent or effect, the term 'non-tariff measures' (NTMs) covers a broader array of regulations affecting traded products.[4] These measures can affect trade in many ways even without protectionist objectives. As this book will show, viewing them exclusively through the lens of protectionist games would be simplistic. They often respond to societal demands for traceability and consumer protection against various hazards, real or perceived – from GMOs, unhealthy foods, environmentally damaging products, fraudulent pharmaceuticals, dangerous toys, and so on – demands that are likely to grow over time and with consumer wealth.[5] Indeed, the WTO recognises the right of countries to regulate trade in order to achieve legitimate non-trade objectives.[6] Thus, NTMs are with us to stay – they have already been around for a while[7] – and perhaps even to proliferate, with or without a protectionist plot.

NTMs are complex instruments; their impact on the economy being felt through multiple channels. They are primarily regulatory instruments targeted at particular market failures, but they affect the distribution of income in many ways through their impact on market structure, costs and rents. Moreover, they generate cross-border externalities not only through usual channels,[8] but also directly by segmenting markets. However, this multiplicity of effects is not what sets them apart, as tariffs are also simultaneously fiscal and trade-policy instruments.

Rather, what sets NTMs apart is how their effects interact with market structure. NTMs have the power to segment markets directly, whether they be technical standards or quantitative restrictions. Thus, they can generate market power in a way tariffs cannot unless they are prohibitive. Their effects also depend on the initial market structure in the importing country. For instance, if there

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2   On this, see Bairoch and Kozul-Wright (1996) or Daudin *et al* (2008).
3   WTO (2012) provides a detailed history of the treatment of NTBs in the multilateral trading system since World War II.
4   Our working definition excludes measures affecting services, as well as domestic production standards, even if they affect the export competitiveness of domestic firms and hence trade flows. That is, if a domestic regulation reduces the export potential of a domestic plant by prohibiting the discharge of polluting effluent in a nearby river (thus raising its operating costs compared to those of foreign competitors), by our definition it is not an NTM. By contrast, our definition includes measures that affect equally imported and domestically produced goods; for instance, a labelling requirement on all food containing GMOs is an NTM. See the chapter by Gourdon and Nicita in this volume for a detailed discussion of conceptual and measurement issues.
5   See Grunert (2005) for a survey of the issues.
6   See Trebilcock and Howse (2001).
7   For instance, English laws in the 17th and 18th centuries required that all colonial trade be conducted on British ships manned by British sailors. Also, certain goods had to be shipped to Great Britain first before they could be sent to their final destination.
8   See Staiger and Sykes (2009).

is a single producing firm in the importing country, a quantitative restriction on imports will give it market power whereas a tariff would not. Thus, *ceteris paribus*, a quota of a thousand tons will lead to a higher equilibrium price in the presence of a domestic monopoly than a tariff reducing imports to a thousand tons.[9] Some of the contributions in this book will show through careful empirics and case studies that the interplay between regulatory design, market structure and political economy that characterises NTMs is particularly complex.

Besides this inherent complexity, from a policy standpoint, what sets NTMs apart is the centrality – and difficulty – of cost-benefit analysis. Balancing the alleviation of market failures against the reduction of trade costs is a difficult exercise for which national administrations are ill-equipped because these considerations are under the purview of different government branches that rarely work together. In addition, the relevant magnitudes have been scarcely analysed or quantified simultaneously, even in the academic literature, except perhaps in the context of legal disputes.[10] We hope that the contributions in this book will improve our understanding of the trade effects of NTMs, so as to put such cost-benefit analyses on an increasingly solid footing.

PART I – PREVALENCE AND PERVASIVENESS OF NTMS

In spite of over three decades of research,[11] how the impact of NTMs on the economy plays out empirically is still far from perfectly understood. Aside from the complexities discussed above, the primary problem is one of transparency, as data on NTMs is very fragmentary. WTO (2012) provides a good overview of sources of information on NTMs. In Chapter 2 of this book, Marc Bacchetta, Jürgen Richtering and Roy Santana describe the achievements and limitations of the WTO's key source of information, the notification system. The notification system's basic problem is one of incentives: because notifications are voluntary with no sanction mechanism, countries can choose whether to notify or not. Countries that do notify expose themselves to objections and possibly criticism, whereas countries that don't maintain an ambiguity – it is impossible to know if lack of notification reflects restraint in the use of NTMs or failure to communicate. Thus, incentives to comply are weak at best.

This voluntary nature makes it difficult to use the data for statistical analysis purposes. Moreover, requirements have traditionally served various purposes and the nature of the information they require Members to notify depends on the purpose they serve. Sanitary and Phytosanitary (SPS) and Technical Barriers to Trade (TBT) notification requirements, for example, aim at allowing other

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9   This was first pointed out in Bhagwati (1968).
10 For a nice example, see Bown and Trachtman (2009). See also Beghin *et al* (2011). See Trachtman (2008) and Cadot, Malouche and Saez (2012) for general guidelines.
11 Prominent early work includes, inter alia, Baldwin (1975), Feenstra (1984), Deardorff and Stern (1985), Deardorff (1987), Baldwin (1989), Leamer (1990), or Anderson and Neary (1994). It is difficult to do justice to the empirical literature on the trade effects of regulations and NTBs since the mid-1990s, as it has grown at a very rapid pace.

Members to influence planned regulations. They do not require Members to notify regulations that pre-existed the entry into force of the SPS and TBT Agreements, nor the new measures in their final form. Thus, even if one sets the incentive issue aside, notifications only provide a partial coverage of NTMs. Moreover, the authors argue that the precision with which information is provided varies considerably across notifications, calling for interpretation and assumptions if one wants to process, summarise and present the information.

Modifying notification requirements and increasing compliance would help improve measurability and would better serve the transparency purpose. The WTO has attempted to go around the incentive problem by encouraging 'reverse notifications', but with limited success. Other possible avenues include expanding specific trade concerns discussions (which seem to have largely replaced reverse notifications) or systematically tapping other sources.

The WTO is now working closely with other agencies involved in NTM data collection efforts to maximise the complementarity between WTO and other sources of information on NTMs. One recent achievement is the creation of a single classification of NTMs merging the 2009 Multi-Agency Support Team (MAST – convened by the Secretary General of the United Nations Conference in Trade and Development and its Group of Eminent Persons on NTBs) nomenclature with that used by the WTO for notifications. In the long run, this has the power to provide a boost to the creation of a much-needed worldwide repository of NTMs. Under the impulse of UNCTAD, WTO notifications have helped populating the World Integrated Trade Solutions (WITS) database on NTMs for 2001/2. Researchers and the World Bank have used this information to compute overall trade restrictiveness indices and ad-valorem equivalents to measure their severity. These efforts have contributed to better apprehend the impact of NTMs on trade.

In 2009, the World Bank has followed the MAST effort and funded NTM data collection in 16 developing countries. Its model consisted of hiring local consultants (universities, think tanks or consulting firms) and giving them assistance and guidelines to draw up NTM inventories in collaboration with ministries and agencies concerned. Relying on outside consultants was meant to solve two basic problems that, as discussed in this report, plague self-notification: (i) fragmentation of the locus of NTM issuance (which makes it more difficult to gather information than in the case of tariffs), and (ii) perverse incentives not to notify in order to avoid exposure. The inventories were formatted according to the international classification, by product affected, together with information on legal sources and enforcing agency, in order to ensure verifiability of the information. Validation workshops were then held to ensure the data's integrity and seek national authorities' approval. Finally, the data was forwarded to UNCTAD for technical checks and posting on WITS.

Data was collected on Egypt, Lebanon, Morocco, Tunisia, Kenya, Mauritius, Tanzania, Uganda, Senegal, Namibia, Madagascar, South Africa, Indonesia, Cambodia, Lao PDR, and Bangladesh, in addition to the seven countries covered by the pilot phase. Data was also collected, independently, by the EU, and a joint

World Bank/AfDB project is financing data collection on China. Counting 11 Latin American countries for which data collection was coordinated by ALADI in collaboration with UNCTAD, data coverage actually stood at 31 countries by the end of 2011 – still a far cry from universal coverage, but nevertheless a marked improvement.[12]

In Chapter 3, Julien Gourdon and Alessandro Nicita offer the first statistical analysis of the new data, exploring the incidence of various types of NTMs across countries and industries. The incidence of NTMs varies considerably across countries, industries and types of measures. Overall NTM coverage ratios vary widely across countries from less than 10% to more than 90%, with no overall pattern in terms of income levels. For instance, the EU stands out with over 85% coverage, but so do a number of East African countries including Burundi, Kenya and Uganda. One might expect strong public concerns about traceability and consumer protection to drive the extensive use of NTMs in the EU, but the rationale for wide coverage in East Africa is less clear – especially in view of efforts to streamline NTBs at the regional level.[13]

Gourdon and Nicita also highlight the prevalence of technical measures – SPS and TBTs – over old-style 'command-and-control' measures such as quantitative restrictions and prohibitions. This may mark a welcome trend toward the modernisation of NTMs, but it may also reflect the deflection of protectionist pressures away from instruments subjected to stronger WTO disciplines. Interestingly, the authors find that NTM coverage ratios correlate *positively* with average tariffs across countries, suggesting policy complementarity rather than substitution. Complementarity would be consistent with the existence of common political-economy drivers to both NTMs and tariffs if both instruments were subject to increasing marginal political costs.

At the time of printing, there was no published work analysing the 'severity' or trade-restrictiveness of NTMs using the new data, but work was ongoing. Roughly, there are three ways of assessing the ad-valorem equivalent (AVE) of the wedge introduced by NTMs between domestic and world prices. The simplest method is a 'handicraft' one[14] that consists in comparing the price of a product affected by an NTM with its price in a similar market without the NTM. It is essentially a case-study approach, widely used in WTO disputes such

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12 As a follow-up to this and other data-collection initiatives, an ambitious multi-agency partnership, Transparency in Trade (TNT), has been set up in 2011 by the World Bank, UNCTAD, the ITC, the WTO and the African Development Bank (AfDB) to coordinate the collection and publication of trade data, including on NTMs. In the area of NTMs, the TNT initiative is expected to give a 'big push' to data collection with donor financing, creating a one-off global public good.

13 See UNCTAD (2012) for a description of COMESA, EAC and SADC NTB monitoring mechanisms. See also EAC/EABC (2007).

14 The expression is from Ferrantino (2006), who provides a thorough description of the issues involved.

as the banana case.[15]   Indeed, it is recommended by Annex V of the WTO's Agricultural Agreement.[16]

Econometric methods fall into two categories: price- versus quantity-based methods. Both methods yield AVEs in a broadly similar range. Price-based methods use the variation of domestic prices at the country-product level to identify the effect of NTMs, marked by dummy variables.[17] The use of a country-product panel makes it possible to include, in addition to tariffs, country-fixed effects to control for transport costs, landlockedness, and other differences in the cost of living, and product-fixed effects to control for differences in supply/demand conditions between products. Examples of price-based econometrics include Bradford (2003), who found average AVEs ranging between 7.8% (Canada), 28% (UK) and 52% (Japan), and Andriamananjara *et al* (2004) who found AVEs of up to 73% (for apparel) on a wide sample of prices obtained from the Economist Intelligence Unit's CityData database. Preliminary results using similar methods in Cadot and Gourdon (2012a) suggest AVEs around 20% for SPS measures in sub-Saharan Africa, where SPS methods are often more bureaucratic hassle than anything else. Augier , Cadot, Gourdon and Malouche (2012) found average AVEs for TBT around 13% in Tunisia and a whopping 60% for SPS in Morocco where, again, SPS measures applied on the domestic market may be less than fully justified by consumer concerns.[18]

Quantity-based methods combine the variation in import values with independent estimates of the price elasticity of import demand to identify the effect of NTMs, also marked by dummy variables. Examples of quantity-based estimation include Kee *et al* (2009) who found, across 4,545 cross-sectional regressions at the product level, average AVEs of 9.2% (using simple averages) and 7.8% (using trade-weighted ones). If one takes out products with no NTMs, averages climb to 39.8% and 22.7% respectively in Kee *et al* (2009).

In Chapter 4, Olivier Cadot and Olivier Jammes illustrate the challenges of using the information generated by the econometric estimation of AVEs of NTMs and feeding it into partial equilibrium models to treat them like tariffs. They highlight subtle difficulties that arise depending on the type of NTMs. For example, licences or permits imposed to domestic importers generate costs borne by consumers after the imported goods have cleared customs, in which case their CIF import value is not directly affected. By contrast, some others, like standards, may impose compliance costs to producers that may be passed

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15 For an overview of the banana case at the WTO, see *http://www.wto.org/english/tratop_e/dispu_e/ cases_e/ds27_e.htm*. For an application of the 'handicraft' price-gap method to Nigeria's import prohibitions, see Cadot and Gourdon (2012b).

16 For a practical application, see *eg* Chemingui and Dessus (2004).

17 Thus, the estimating equation is like a difference-in-differences equation with product-country pairs 'treated' by NTMs. If political-economy considerations are at play, the treatment can be instrumented as in Cadot and Gourdon (2012a).

18 Paradoxically, while imposing price-raising NTMs, Morocco has food and fuel subsidies meant to contain the cost of living, but at a staggering cost (18% of government expenditure and 4.5% of GDP in 2008).

on, in full or in part, into the CIF value of imports. In such cases the treatment must be different than for tariffs.

The authors use the World Bank Tariff Reform Impact Simulation Tool (TRIST) model as a vehicle to illustrate some of the difficulties involved. In particular, they show with a numerical example that eliminating a standard may lead to reduced fiscal revenue from VAT and border taxes. However, the effect on the tax base is less than the reduction in the compliance cost (the NTM's AVE) because direct effects and demand effects work at cross-purposes. The direct effect of eliminating the compliance cost reduces the CIF value of imports and thus the tax base, but the price reduction raises import volumes and thus the tax base. If the elasticity of import demand is more than one, eliminating the standard will raise the tax base. At the other extreme, if it is close to zero, the tax base will shrink by close to the NTM's ad-valorem equivalent.

PART II – STANDARDS AND TECHNICAL REGULATIONS: TRADE BARRIERS OR FACILITATORS?

Since the pioneering contributions of Otsuki *et al* (2001a, 2001b), evidence has accumulated that standards and technical regulations,[19] and in particular their lack of harmonisation, can act as barriers to trade, in particular for developing country exports.[20]

Wilson *et al* (2003) found that the stringency of antibiotics regulation for bovine meat significantly reduced trade. Using their estimates to simulate the effect of harmonisation of antibiotics regulations on the Codex Alimentarius standard, they argued that South African, Brazilian and Argentine beef exports would benefit substantially. The trade-inhibiting effect of SPS regulations on developing-country agri-food exports was highlighted in a number of case studies, including, *inter alia*, Henson *et al* (2000), Rahman (2001), Musonda and Mbowe (2001), Henson *et al* (2004) or Henson and Mitullah (2004). The most exhaustive assessment of the effect of technical regulations on agricultural trade was carried out in Disdier *et al* (2008), who regressed disaggregated bilateral trade flows in a gravity framework on coverage ratios and, in some specifications, on AVEs as well, controlling for tariffs. In accordance with the case studies and with the work of (*inter alia*) Moenius (2004), Maskus *et al* (2005), and Essaji (2008), they found significant trade-inhibiting effects.

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19 In everyday language, the term 'standards' refers to regulations affecting the technical or sanitary characteristics of products. The WTO prefers the term 'technical regulations', reserving the term 'standards' to private ones, such as requirements imposed by supermarket chains on their suppliers. In this book, as much as possible we will stick to the WTO terminology rule.

20 Otsuki *et al* (2001b) used a gravity equation to simulate the effect of the harmonisation at a stringent level of the EU's aflatoxin regulation on African exports. They predicted an export loss of $670 million. Their findings were later confirmed for South Africa, using the same combination of gravity estimates and simulation, by Gebrehiwet *et al* (2007). However, a recent article by Xiong and Beghin (2011) using *ex-post* estimation suggested that Africa's groundnut exports to the EU were, contrary to Otsuki *et al*'s grim predictions, unaffected by the new regulation, the key determinant of African groundnut exports being domestic supply conditions.

By contrast, only a small number of papers have looked at how the *enforcement* of SPS measures affects developing country exports. Alberini *et al* (2008) examined the enforcement of the FDA's seafood plant inspection programme, while Baylis *et al* (2010) used the standard gravity methodology to demonstrate the trade-reducing effect of US import refusals.

In Chapter 5, Marie-Agnès Jouanjean, Jean-Christophe Maur and Ben Shepherd push the analysis of US import refusals further to analyse the importance of reputation in the enforcement of SPS measures. Their chapter reports striking evidence that reputation effects matter in the enforcement of US SPS measures through the import refusals system. Unsurprisingly, strong reputation effects come from a country's own history of compliance in a particular product; however, the data also suggest two spillover channels. First, import refusals are less likely if the exporting country has an established history of compliance in relation to *other goods* in the same sector. Second, an established history of compliance in relation to the same product by *neighbouring countries* also helps reduce the number of import refusals. The authors also find some evidence that these effects tend to be stronger for lower income countries.[21] Incidentally, Jouanjean *et al*'s chapter highlights a relatively little-known feature of the US agri-food markets – namely, the existence of a positive list of countries allowed to export fruit and vegetables to the US. A producer from a non-approved country willing to enter the US market would find a closed door, until all procedures for the country's inclusion in the positive list have been met.[22]

The authors' findings highlight the importance of a comprehensive approach to upgrading quality-support infrastructure systems in exporting countries, focusing on interlinked clusters of products rather than individual ones. It is not sufficient to export a mix of compliant and non-compliant goods: reputation matters, and the presence of the latter will make it harder to get the former into the market as well. Consistency and reliability of production are therefore key issues in the development of SPS capacity in poor agricultural exporters. They also highlight potential benefits from regional cooperation in building SPS compliance capacity and reputation. Regional approaches to the development of standards systems are becoming more common for many reasons, such as the ability for small, poor countries to pool technical and financial resources

In Chapter 6, Olivier Cadot, Mélise Jaud, and Akiko Suwa-Eisenmann also find that reputation matters for exports to the EU. They examine the link between the sanitary risk of food products and recent changes in the EU's food-import pattern, using a product-specific measure of sanitary risk constructed from a new database of food alerts at the EU border. They argue that a raw count of alerts could not measure correctly sanitary risk at the product level, as a product imported from countries with weak quality management systems would appear as risky even though some exporters might export it safely. Instead, they propose

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21 Although the nature of the externality is different, Jouanjean *et al*'s results in this chapter are consistent with those of Cadot *et al* (2011) which highlighted the existence of cross-firm externalities in the survival of export products.

22 For more details, see Jouanjean (2012).

a measure of sanitary risk at the product level retrieved as the coefficient of a product fixed effect in a regression of the count of alerts on exporter, importer and bilateral control variables, including proxies for hidden protectionism.

Using their measure of sanitary risk at the product level, they find evidence that the management of sanitary risk has indeed affected EU import patterns. Overall, they observe a slight diversification of import sources over time; however, this overall trend hides diversification at the extensive margin and concentration at the intensive margin, in particular for risky products. That is, on the one hand, the bulk of EU agro-food imports are being increasingly sourced from a few countries; on the other hand, new suppliers enter the EU market, but on a smaller scale than before, especially for risky products. As a result, EU agro-food imports gradually evolve towards a two-tier distribution with a small number of dominant suppliers and a growing fringe of marginal ones.

If product standards and technical regulations can act as trade inhibitors, recent empirical work suggests they can also act as trade facilitators.[23] For instance, they can alleviate asymmetric-information problems (moral hazard and adverse selection in terms of product quality) by subjecting all producers to a common quality standard and encouraging them to invest in quality. Maertens and Swinnen (2009) provide a detailed account of this effect in Senegal; see also Jaffee (2003, 2005).

In Chapter 7, using a new database on Chinese standards, Axel Mangelsdorf, Alberto Portugal-Perez and John Wilson approach the issue from a different angle, looking at the effect of standards – voluntary and mandatory – in the *exporting* country. They use a new database of Chinese food standards for seven groups of agricultural products: meat, fish, vegetables, cereals, milk, tea, and sugar over the period 1992–2008. Their results show that standards have a positive effect on China's export performance, as the benefits to standardisation in terms of reducing potential information asymmetry and signalling enhanced food safety and quality in foreign markets seem to surpass compliance costs. The positive effect of Chinese standards is larger when they are harmonised to international measures. The results suggest that there are clear benefits to China's steps to base their domestic standards and regulations on international measures.

As a counterpoint, in Chapter 8, Olivier Cadot, Anne-Célia Disdier and Lionel Fontagné highlight the potential dangers, for Southern countries, of premature harmonisation with stringent Northern standards. For instance, as part of the modernisation of its regulatory environment, Mauritius has recently been considering the adoption of a technical regulation on toxic chemicals used in paints that would closely resemble EU regulations. The benefit of harmonising technical regulations with the EU is that Mauritius's paint manufacturers could have their products distributed in EU supermarkets, including in the nearby

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23 For an early discussion, see Jaffee and Henson (2004).

Reunion. However, production costs would increase,[24] and the increase would, in all likelihood, price them out of East and South African markets where chemical residues in paints are not an issue. Would enhanced access to Northern markets compensate foreseeable losses on Southern ones?

The authors generalise on this example to ask how the harmonisation of technical regulations in the context of North–South regional trade agreements (RTAs) affects trade patterns. The issue is particularly pregnant for countries in the zone of influence of large commercial powers, like Middle East and North Africa (MENA) countries with the EU, as they may be encouraged to converge rapidly in terms of regulatory environments. The authors explore the issue empirically by combining a gravity model with an extension of Piermartini and Budetta's (2009) database on RTAs containing information on regulatory-harmonisation clauses. Strikingly, they find that RTAs with harmonisation clauses do reinforce hub-and-spoke trade structures (centred on the Northern RTA partners) potentially detrimental to the integration of Southern countries in the world economy, reinforcing previous findings by Chen and Mattoo (2008) on the trade-diverting effects of regional harmonisation. In a world where South-South trade grows faster than North–South (Gourdon, 2011), this may be a high price to pay.

When they are harmonised, standards and technical regulations can also contribute to reduce market fragmentation by overcoming coordination failures among producers and ensuring interoperability (for instance, harmonising electric-plug design improves the tradability of electrical appliances).[25] For instance, Shepherd (2007) showed that a country adopting international standards significantly raised the variety of its import sources, in particular from low-income countries, suggesting a significant market-access improvement. In the same vein, Czubala *et al* (2009) showed that the trade-restricting effect of the EU's technical regulations in the textile and apparel sector on African exports was mitigated when those technical regulations were consistent with international standards.

However, the effects of standards harmonisation can be complex. In Chapter 9, using a rich firm-level dataset, Jose-Daniel Reyes highlights in a novel way the interplay between standards harmonisation and market structure, using as a natural experiment the harmonisation of EU electronics regulations and their alignment on international standards that took place between 1991 and 1996 under the Lugano and Dresden agreements, which reduced the proportion of EU-specific standards from half to about a quarter. Using highly detailed firm-level data on US electronics exporters, he shows that the harmonisation of EU technical regulations raised US exports at the 'extensive margin'; that is, by inducing entry of new US exporters. This suggests that barriers to entry were reduced by the harmonisation. It also shows that harmonisation can increase

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24 In an interview with the authors, a local producer estimated the cost increase at 2% to 40% of baseline average costs, depending on the product.

25 For an interesting case study of the effect of multiple standards on trade, see Raballand and Aldaz-Carroll's (2005) study of the market for pallets.

the intensity of competition on a given market. However, Reyes also highlights an interesting side-effect: as competition became tougher on the EU electronics market with the entry of new US competitors (and, presumably, more intense intra-EU competition), producers from developing countries were sidelined and lost market share. This is paradoxical, as the lowering of trade barriers had apparently opposite effects on US and developing country competitors, raising profitability for the former and reducing it for the latter. Clearly, modelling the effect of regulations in a heterogeneous-firm framework is needed to highlight the complex effects at play.

One policy implication is clear from Reyes' analysis – namely, that as harmonisation and mutual recognition of technical regulations raise the intensity of competition, donors may want to think about strengthening technical-assistance programmes for developing country exporters to help them strive in tough, competitive environments.

Harmonisation processes, like all regulatory decisions, can also be hijacked by special interests, and their political economy, still relatively unexplored, feeds on market-structure effects of the type that Reyes identified. In Chapter 10, Michael Jensen and John Keyser discuss the recent decision by the East African Community (EAC) to harmonise member states' technical regulations for dairy products with international ones. The authors argue that the approach does not make much sense from a 'benevolent' welfare perspective given local consumption habits (no-one consumes the milk without first boiling it). By contrast, harmonisation is likely to stifle intra-regional trade in dairy products, as only the very largest operators are capable of meeting the stringent international standards – indeed, it is a barrier to entry for smaller producers that suits the interests of the larger ones.

PART III – GOVERNMENTS' EFFORTS TO IMPROVE NTMs

The third part of the book is dedicated to the policy options for governments to unilaterally improve the process, design and implementation of NTMs. While WTO multilateral efforts to harmonise NTMs have not made any tangible progress, and regional efforts tend to be lengthy processes and product or sector specific, the unilateral approach to improve NTMs to maintain firms' competitiveness is realisable by all governments.

The World Bank has recently developed practical guidelines based on an innovative approach that carefully balances the reduction of business costs against the preservation of 'local public goods'. Cadot, Malouche and Saez (2012) argue that seeking to eliminate NTMs altogether or to cut their number through mechanical formulae would likely be an ill-conceived quest. Most NTMs respond to a genuine public demand for traceability and protection against hazards to health and the environment – a demand that can be expected to grow over time and with wealth. Thus, except in the case of obvious non-tariff barriers, policy toward NTMs should strive for their improvement through better design, smarter enforcement and, ultimately, through a robust governance

framework. Moreover, NTM improvement should be viewed primarily as a domestic issue, part of a regulatory improvement agenda driven by a concern for enhanced competitiveness, rather than as a concession to trading partners.

The toolkit's approach features a sequential analysis that identifies (i) where the problem lies (if there is a 'market failure' that justifies government regulation), (ii) whether the existing measure addresses it adequately and in a cost-minimising way, and (iii) how, overall, the measure's costs compare with its benefits. It is adaptable, depending on (i) the scale of the problem, (ii) local capabilities, and (iii) political traction for reform. Moreover, its implementation can start on a small scale. Its basic assumption, though, is that the content and depth of NTM reviews should not be watered down for the sake of adaptation to limited-capabilities environments, lest the exercise become useless. Instead, it should be accompanied by targeted and well-conceived technical assistance.

The toolkit also proposes an institutional setup to organise practically the NTM review process. The setup is centered on a committee bringing together all government agencies involved in the issuance of NTMs, the private sector, and civil society (representatives of consumers or environmental associations). Considerable long-term benefits can be expected from embarking in such a process, even if starting progressively. First, the review mechanism provides a forum for competitiveness-oriented dialogue with the private sector which can have benefits going well beyond NTMs. Second, the review process can progressively set the stage for a larger institutional mechanism to improve the governance of new measures, trade-related or not. One may even envisage, in the long run, the merger of regulatory-oversight and competition-watchdog functions, as these functions draw on the same type of expertise (law and industrial economics), and a single overseeing agency may have more clout. Third, if such institutional mechanisms were to be set up in several countries in a region or trading bloc, with similarly trained personnel, they could provide an informal vehicle for the regional coordination of new measures at the technical level, before uncoordinated decisions have a chance to generate political friction.

Numerous initiatives have strived to coordinate the reduction of non-tariff barriers at the regional level, although with unequal success (see UNCTAD, 2012 for an overview). In Chapter 12, Ian Gillson and Nick Charalambides draw lessons for developing countries from the experience of southern Africa, arguing that there are clear benefits from closer regional coordination in regulation and standards, particularly where national agencies face technical skill shortages or capacity constraints. Furthering efforts to develop appropriate regional standards (*eg* through SADCSTAN) can also reduce the costs of trading across borders and reduce the scope for capture by national private sector interests (see the discussion of dairy regulations, *supra*). Unlike other regions in the continent, southern Africa has the distinct advantage that world-class testing bodies and accreditation services are already available in South Africa. Regional integration can leverage the capacity of these institutions to support exports and capacity in the less advanced countries, eliminating the practice of double testing and certification. Alternatively, countries could consider steps towards implementing

a regional framework for mutual recognition of the conformity-assessment procedures qualifications/licences for service providers.

The authors also discuss a significant regional transparency initiative, the NTB Monitoring Mechanism (NTBMM), suggesting leads to push the mechanism in the direction of effective NTB removal. However, success has been limited so far, highlighting the difficulty of setting up regional agendas when capabilities are limited at the supranational level and the drive for regional integration is weak.

At the country level, the NTM improvement agenda should be viewed primarily as a domestic issue, part of a regulatory-improvement agenda driven by a concern for enhanced competitiveness, rather than as a concession to trading partners. This is the perspective taken by countries that have successfully adopted ambitious regulatory-reform agendas, like Korea or Mexico.

In Chapter 13, Ali Haddou draws important lessons from Mexico's regulatory-reform efforts since the 1990s. Mexico embarked in an ambitious regulatory reform in the middle of the December 1994 'tequila crisis' when it became clear that recovery could only come from export-led growth, requiring a drastic improvement in the environment of business. According to Haddou, including trade issues under the fold of a government-wide regulatory improvement was key to make it a vehicle for improved competitiveness. He also highlights the importance of consistency and breadth, as reforms showed strong complementarities and could not efficiently be tackled piecemeal. Most importantly, for Haddou what matters in the process is not so much reducing trade costs by eliminating this or that measure, but putting in place a robust governance framework to ensure the sustainability of regulatory improvement. Drawing on the Mexican experience, he advocates the creation of a central regulatory-oversight body with sufficient capabilities and clout to articulate a vision for the country's regulatory and trade policy beyond the vagaries of short-term lobbying and electoral demands.

Mexico's experience highlights the long-term challenges that await a regulatory-reform drive. Whereas the country's anti-trust body has thrived and gained political clout, COFEMER, its regulatory-oversight body, seems to have picked fights that proved unwinnable and progressively lost its power and momentum. This raises the issue of whether regulatory-oversight and antitrust functions should be merged and entrusted to a single watchdog agency overseeing both the private sector's anti-competitive practices and the public sector's regulatory abuses. This would put the agency in an impartial position, leverage synergies in its work (as antitrust and regulatory issues are deeply intertwined) and would generate economies of scale, drawing on similar expertise (essentially law and industrial economics).

In Chapter 14, Silvia de Miranda sheds light on Brazil's ongoing efforts to apply Regulatory Impact Assessment (RIA) to new SPS regulations. First-hand experience with this process allows her to draw lessons on key success factors, including financial commitment to support solid analytical work. Given financial constraints in developing countries and the fact that governments do

not always apprehend, *ex-ante*, the benefits they may reap by applying RIA, this is an area where donor support could be critical. Another critical success factor when implementing RIA is to count on wide stakeholder participation. RIA allows for a consultancy process at all steps, from the new regulation's definition and submission to the discussion of the RIA's results, in order to raise public awareness before the regulation is issued. Effective consultation not only reduces the risk of policy mistakes, but it also ensures buy-in and reduces adaptation costs.

Both Haddou's and Miranda's analyses highlight two key challenges facing regulatory reform and the effective deployment of RIA. First, given the fragmentation of regulatory authority across government agencies and ministries, communication and coordination are key, although typically few structures exist for such coordination, bureaucratic structures being often more conducive to rivalry than to cooperation. Second, it requires strong top-down political will, preferably from the highest level, in order to ensure that deadlock resulting from 'horizontal' conflicts between ministries or agencies with different mandates and views can be broken.

Does this mean that nothing can be done if everything is not done? To some extent, yes. International experience suggests that piecemeal regulatory reform is inefficient and vulnerable to reversals. However, it also suggests that sweeping political drives for efficiency, relying on radical approaches such as the so-called 'guillotine' (which consists in eliminating a certain number or proportion of regulations, or all those that do not have a compelling justification), may either quickly lose steam when serious trade-offs appear, or become 'deregulation' drives rather than drives for regulatory improvement, with potential costs for local public goods such as consumer safety or the environment. Thus, in order to prepare the ground for regulatory reform, long-term engagement is needed to help administrations build analytical capabilities and learn to tackle technical problems with pragmatic, technical solutions. This is the approach of the World Bank's NTM streamlining toolkit (Cadot *et al*, 2012).

This approach emphasises the need to reduce the costs incurred by the private sector in complying with regulations while not diluting their power to protect consumers and the environment. While the principle is clear, how to implement it on the ground is not always self-evident. In Chapter 15, Christopher Grigoriou discusses this key practical issue in the context of SPS measures. Drawing on the state of the art in border management, he shows how risk management can be used to reduce the incidence of controls while keeping the risk of non-detection undiminished. Using econometric techniques well known to economists, he shows that risk profiling can use the track record of operators as well as observable risk factors to target inspections to where they have the highest power to detect fraud or quality-control failures.

KEY TAKEAWAYS

Three main takeaways may be highlighted following this new thread of data and analyses:

First, new effort to collect data in both developed and developing countries has helped shed light on the prevalence and pervasiveness of NTMs. This effort calls for more data collection and analysis of the trade restrictiveness of NTMs. The new Transparency in Trade (TNT) initiative led by the World Bank, UNCTAD and the International Trade Centre, with contributions from some regional development banks and selected donors, would help make the NTM data collection more widespread and sustainable across economies. Transparency in the area of trade policies is essential. It plays an important role in allowing private economic agents to make informed decisions and thereby helps markets function more efficiently. Transparency in NTMs has become prominently crucial with the increased use of NTMs to regulate international trade, including during crisis times.

Second, governments should recognise the importance of addressing the NTMs as part of their domestic competitiveness and business regulatory reform agendas. Governments should aim to adopt good regulatory principles and improve inter-government coordination with wide consultation processes. Governments should set up a coordination committee among ministries that issue trade regulations and facilitate consultations with the main stakeholders, including representatives of consumers or environmental associations. Regulatory Impact Assessment should be adopted to improve the quality of regulations and to avoid unnecessary burden and nuisance for private operators. Risk management techniques can also be used by Customs and other border agencies to reduce the incidence of controls at the border. These instruments should be tailored to the scale of the problem, local capabilities and political traction for reform.

Finally, regional harmonisation of standards, in particular North–South harmonisation, should be conducted strategically and in a flexible way, modulating the speed of convergence on the basis of export potential from developing countries. For sectors whose primary export potential is the main regional partner, fast harmonisation may be optimal; for sectors whose primary export potential is in the South, slow harmonisation may be better. Small farmers and producers may suffer the most from unnecessary harmonisation. Moreover, as harmonisation and mutual recognition of technical regulations raise the intensity of competition, developing country exporters would highly benefit from technical assistance programmes to help them strive in tough competitive environments.

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PART I

Prevalence and Pervasiveness of NTMs

2

How Much Light Do WTO Notifications Shed on NTMs?

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2.1 INTRODUCTION

Transparency in the area of trade policies is essential. It plays an important role in allowing private economic agents to make informed decisions and thereby helps markets function more efficiently. Also, Bhagwati (1988, p 85) has suggested that protectionism can be cut back by what he calls the Dracula effect: exposing 'evil' to sunlight helps to destroy it. Awareness of the existence and of the cost of certain policies, both within the country and in its trading partners, can put pressure on governments to eliminate them. Even if transparency does not directly 'destroy' barriers to trade, however, it can indirectly contribute to more open trade by facilitating trade cooperation. While the theory of international trade cooperation has little to say about transparency, because it typically assumes that agents are all perfectly informed, there are good reasons to believe that imperfect information is, in practice, an important issue in the case of trade agreements. If this is true, transparency can play a role in improving Members' compliance to the commitments they have made as part of a trade agreement.

  One of the functions of the WTO is to facilitate the implementation, administration and operation, and further the objectives, of the Marrakesh Agreement and the Multilateral (and Plurilateral) Trade Agreements.[2] Because transparency at both the multilateral and the national level is essential to the smooth operation of the agreements, and more broadly to the good functioning of the multilateral trading system, WTO Agreements include multiple transparency provisions. Following Wolfe (2003) and WTO (2007), these transparency provisions can be grouped into five categories: (a) goods and services schedules of concessions; (b) the Trade Policy Review Mechanism; (c) publication and notification requirements; (d) internal transparency of the institution towards its Members; (e) external transparency of the institution towards civil society. The first three categories cover provisions that ensure the transparency of national

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1   The authors are members of the WTO Secretariat. The views expressed here are their own and should not be attributed to Members of the WTO or to the Secretariat.
2   Article III.1 of the Marrakesh Agreement Establishing the WTO.

policies, which in the area of trade in goods can be roughly divided into two groups: tariffs and non-tariff measures (NTMs).

While considerable efforts to improve transparency on the tariff side have been made since the end of the Uruguay Round, which have also benefited from technological progress in the information technology area, much remains to be done in the area of NTMs. By the end of the Uruguay Round tariff information was only available electronically for about 40 Members and it was not available to the general public because of very restrictive data dissemination policies. Since then, the situation has improved dramatically, both with regard to data coverage and data dissemination policies which are now far less restrictive.[3] Thanks to these developments, information on tariffs is now freely available through the WTO website and covers all WTO Members' bound commitments in the Consolidated Tariff Schedules (CTS) database, as well as a large and increasing percentage of Members' applied tariffs in the Integrated Data Base (IDB). With tariffs largely under control, attention has now turned towards NTMs, a broad category that encompasses all trade and trade-related policy measures with the exception of tariffs, which could restrict or distort international trade in goods. Various initiatives aimed at enhancing transparency of NTMs have been launched, one of which involves several multilateral agencies.[4]

Together with the publication obligation under Article X of the GATT 1994 and the Trade Policy Review Mechanism, notifications are one of the three mechanisms generating information on NTMs in the WTO system. This chapter examines the role that notifications play in the WTO and, more broadly, in the multilateral trading system. More specifically, it asks what role notifications have played and could play as a source of information on NTMs. It starts with a discussion of the reasons why, and the manner in which, notifications were developed under the GATT 1947. Section 2.3 then offers a description of the current notifications landscape under the WTO and assesses how much of the NTM universe is covered by such notifications. Section 2.4 discusses the quantity and quality of notifications under the WTO, and concludes that in most cases both compliance with the requirements and the quality of information received are low. Section 2.5 considers what would be needed to expand their role as a major source of transparency in NTMs. Section 2.6 concludes.

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3   Two key decisions in July 2009 contributed to this improvement. The decision of the Market Access Committee on a ''Framework to enhance IDB Notifications Compliance'' (G/MA/239 of 4 September 2009) made it easier for the Secretariat to assist Members in providing their trade and tariff notifications by allowing the use of other relevant official sources. The second decision (G/MA/238 of 4 September 2009) on full public disseminations of all tariff line duties created the basis for the WTO to become a key player in the dissemination of tariff data information to the general public.

4   See UNCTAD (2010).

2.2   Notifications in the GATT 1947

At the time negotiations for the establishment of an International Trade Organization (ITO) began in 1946, the General Agreement on Tariffs and Trade (GATT) was foreseen as a parallel and provisional 'tariff' agreement that would lock in a number of tariff concessions while the broader negotiations were concluded. The negotiating plan that was approved by the 'Preparatory Committee' in February 1946 envisaged that the GATT would be legally independent of the ITO Charter and would be brought into force as soon as possible.[5] In order to safeguard the value of the tariff concessions that would be made in the GATT, and which would eventually become part of the ITO framework, a number of 'non-tariff' clauses would be included in the General Agreement by referencing or reproducing text from the 'draft' ITO Charter.[6]

   Probably because of its provisional nature and lack of a formal structure, the General Agreement that was signed at the end of 1947 only made scant reference to formal notification requirements.[7] As will be described in this section, the vast array of notification requirements that exists today at the WTO is not only the result of the provisions originally included in the GATT 1947, but also of a series of decisions and agreements that were subsequently taken which progressively developed new requirements, procedures, questionnaires and formats. Moreover, the rationale behind the notification requirements also evolved to take account of the changing needs of the multilateral trading system.

2.2.1   The Havana Charter, the GATT 1947 and its modifications

While the terms 'notify' and 'notification' only appeared in Articles XVI and XVIII of the GATT that was signed in October 1947, there were other provisions that required formal communications by the contracting parties. These included three Articles which made reference to 'notices'[8] and eight which required contracting parties to 'consult' when introducing certain measures.[9] In contrast, the Havana Charter (HC), which was meant to bring into life the ITO, stipulated a higher number of 'notifications',[10] some of which were not required by the GATT. These included notification requirements relating to quantitative restrictions (HC Article 20:3(b)), state monopolies (HC Article 31), and establishment of customs unions or free trade areas (HC Article 44:3(a)). The

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5   Resolution adopted on the First Session of the Preparatory Committee of the United Nations Conference on Trade and Employment, established by the Economic and Social Council of the United Nations on 18 February 1946. See Annexure 10 of UN doc. E/PC/T/33, Sections C and H.

6   The original plan did not work as intended and changes had to be introduced, including the adoption of provisions revised in the context of the ITO. See, for example, GATT/CP.2/22/Rev.1 of 30 August 1948.

7   See UN document E/PC/T/214.Add.1.Rev.1.

8   Articles XIX:2 and 3(a), XXVII, XXVIII:2(a) of the GATT that was signed in 1947.

9   Articles VI:6, XII:4, XIII:4; XIV:6(b); XV:2 ; XIX; XX:II(c) of the GATT that was signed in 1947. In addition, Article II:6(a) requires 'concurrence' to adjust specific duties.

10 See, for example, Havana Charter, Articles 13:6, 9 and 10; 14:1; 20:3(b); 25; 28:2; 31:3; and 44:3(a).

Havana Charter also provided a general 'information' obligation through Article 50:3, which required that '[e]ach Member shall furnish to the [ITO], as promptly and as fully as possible, such information as is requested by the Organization for its consideration and investigation of complaints and for its conduct of studies under' the trade Chapter.

Notifications under the GATT 1947 had simpler goals. Leaving aside the notices of a purely procedural nature (e.g. the ones making requests for consultations), there were mainly two types of notifications. The first one required contracting parties to give notice before certain measures were introduced, which would then be followed by consultations and eventually negotiations for compensation. This is the case, for example, of the 'emergency actions' under Article XIX[11] – which could nevertheless be dispensed in case of 'critical circumstances' – and Article XVIII for the introduction of 'non-discriminatory measures' that would conflict with concessions under Article II of the GATT (e.g. tariff bindings).[12] The second type of notification required contracting parties to notify certain measures in place in order to be able to preserve them. This was the case of Article XVIII:6, which allowed contracting parties to preserve non-discriminatory measures for the reconstruction of particular industries or branches of agriculture in force before 1 September 1947, as long they were notified by 10 October 1947.[13]

Since the GATT 1947 had borrowed language from the draft ITO Charter of 1946, and the 'equivalent' ITO provisions had continued to evolve as the parallel negotiations progressed, contracting parties considered it necessary to incorporate the revised language. This was done through a series of Protocols amending the General Agreement, three of which were open for signature at the same time as the Havana Charter in 1948.[14] An additional 'Protocol modifying Part II and Article XXVI of the GATT', was agreed shortly afterwards amending Articles III, VI, XIII, XV, XVIII and XXVI.[15] These amendments introduced a new series of ad hoc notification requirements, including inter alia in: (1) Article XVIII: 6, 8, 11 and 12, which resulted from a complete redraft of these

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11 Article XIX:2 provides that before any contracting party can take action as per XIX:1, it shall give notice in writing to the other contracting parties as far in advance as may be practicable. Contracting parties having substantial interest shall be afforded an opportunity to consult in respect of the proposed action.

12 Article XVIII:2(a), 4(c), 5(a) and (b) of the GATT that was signed in 1947.These notifications would trigger a response by the contracting parties considering to have been 'substantially affected' by the proposed measure, an 'examination' where contracting parties would notify if they 'concur[red] in principle with the proposed measure' and, eventually negotiations to reach 'substantial agreement'.

13 This would, however, not be a permanent exception. Within 60 days after becoming contracting parties, relevant contracting parties should also notify the reasons in support of preserving those measures and the period for which they wished to maintain them. Other Contracting Parties would then examine and decide whether said measures would need to be modified or withdrawn.

14 See Press Release, ITO/228, of 24 March 1948. These included the Protocol Modifying Certain Provisions of the GATT (entry into force: 15 April 1948), Special Protocol Modifying Article XIV of the GATT (entry into force: 19 April 1948), and the Special Protocol Relating to Article XXIV of the GATT (entry into force: 7 June 1948).

15 GATT/CP.2/34 of 3 September 1948. A consolidated version incorporating five of these protocols was circulated in October 1948 in document GATT/CP/2, but some of the amendments were not applicable to all contracting parties. See GATT/CP.4/6.

provisions; (2) Article XXIV:7(a), where contracting parties forming a customs union or free trade area were required to promptly notify that fact, together with a series of information that would enable contracting parties to make reports and produce recommendations.

Once contracting parties realised that the Havana Charter would not enter into force, a decision was taken on 24 October 1953 to review the GATT in light of the experience gained since its provisional operation.[16] The results of such review were embodied in the 1955 'Protocol Amending Part II and Part III of the GATT'[17] which introduced a large number of amendments, including new notification requirements relating to subsidies (Article XVI:5(b)) and state trading enterprises (Article XVII:4(a)). A Part IV was subsequently added in the 1960s to take account of the development dimension, which included in Article XXXVII:2 the possibility to 'report' if commitments by developed contracting parties under XXXVII:1 were not being given effect. Revised reporting procedures were agreed in 1965, which were followed by guidelines for notifications.[18]

2.2.2 The 1950s and 1960s

As experience in the application of the General Agreement grew, contracting parties were faced with new situations where notifications were required. For example, the Protocol of Provisional Application (PPA) that accompanied the GATT allowed contracting parties to retain certain GATT inconsistent measures pre-dating it. There was, however, no requirement to notify them.[19] This lack of transparency eventually led to disagreement in one case where a contracting party claimed that certain restrictions on agricultural products were covered by the PPA, but the other contracting parties disagreed.[20] Contracting parties were required thereafter, in 1960, to notify all the residual restrictions they maintained and recognised were inconsistent with the GATT.[21] This requirement eventually evolved into a two-yearly notification of 'residual restrictions'.[22]

Notifications required by Articles of the GATT also evolved through agreed procedures and guidelines, some of which made use of questionnaires. For example, contracting parties were required in 1958 to notify every year changes

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16 G/70 of 12 November 1953. See also SR.8/20.
17 W.9/246 of 6 March 1955.
18 BISD 13S/79. See also BISD 24S/55.
19 UN document E/PC/T/214.Add.2.Rev.1. The Protocol of Provisional Application stated that contracting parties would provisionally apply on and after 19 January 1948: '(a) Parts I and III of the General Agreement on Tariffs and Trade, and (b) Part II of that Agreement to the fullest extent not inconsistent with existing legislation' (emphasis added).
20 Request by Federal Republic of Germany, BISD 8S/31.
21 BISD 9S/19-20 and 11S/206-210. TN.64/NTB/7 indicates that the following contracting parties had notified import restrictions: Australia, Austria, Benelux, Canada, France, Germany, Italy, Japan, Norway, Portugal, Federation of Rhodesia and Nyasaland, Sierra Leone, Sweden, United Kingdom, and the United States.
22 NTM/W/6/Rev.3 of 8 August 1986.

to their rules relating to marks of origin (Article IX).[23] Similarly, contracting parties agreed in 1960 on procedures for the notification of restrictions for balance-of-payment purposes,[24] and questionnaires on state trading, subsidies and anti-dumping.[25] In 1962, new notification procedures invited contracting parties to notify responses to questionnaires on subsidies and state trading every three years.[26]

New notification requirements also resulted from informational needs stemming from negotiations. For example, contracting parties agreed in 1958 to a 'Programme for Expansion of International Trade' which envisaged the notification of agricultural policies.[27] 'Committee II' was tasked with assembling data relating to agricultural products, in collaboration with FAO, and determining whether GATT rules had been inadequate in respect of those products. Contracting parties were asked to submit data in connection with: (1) subsidies, including all forms of income and price support; (2) mixing regulations; (3) import restrictions; (4) state-trading operations; and (5) a description of national agricultural policies.[28]

Contracting parties also explored the use of notifications as a tool for trade promotion and assistance to exporters. Bearing in mind the publication requirements of Article X:1, a 'Group of Experts in the Field of Trade Information' examined in 1964 the means of establishing and operating an 'international trade information centre'.[29] This group recommended the establishment of trade information and trade promotion advisory services in the GATT framework, which would rely on copies of laws, regulations, decisions, rulings and agreements, of the kind described in Article X:1 that would be provided by contracting parties to the Secretariat.[30] Contracting parties were also expected to indicate in their regular notifications whether such information could be made available at large through the new services. Based on this recommendation, contracting parties agreed to: (1) establish a 'document centre', (2) operate a 'clearing house' for trade information (today known as 'inquiry points'), and (3) publish a 'Register of Sources of Trade Information'.[31] However, a 1978 note by the Secretariat notes that response to this recommendation was limited, except in what concerned national tariffs.[32]

As negotiations began to deal with issues other than tariffs, contracting parties found a new role for notifications: the identification of non-tariff barriers. The Ministerial Decision launching the Kennedy Round provided for the large-scale

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23 BISD 7S/30.
24 BISD 9S/18.
25 BISD 9S/184 (state trading) and 193 (subsidies). The anti-dumping questionnaire can be found in L/1071 of 19 November 1959
26 BISD 11/58-59.
27 Decision of 17 November 1958, L/939.
28 See GATT BISD 7S/28, L/1192, and L/1461.
29 L/2181 of 13 March 1964.
30 Recommendation of 20 March 1964, L/2207.
31 L/2181 of 13 March 1964.
32 MTN/FR/W/17 of 1 August 1978.

negotiation of non-tariff barriers affecting trade,[33] which were subsequently based on 'reverse-notifications'. Unlike the normal 'self' notifications, where contracting parties provide information about their own trade policies, reverse notifications seek to obtain information on barriers faced in other markets.[34] Notifications received during the Kennedy Round led to a list of 18 measures to be negotiated, which ranged from measures regulated by the General Agreement to product-specific problems and measures maintained by a single contracting party affecting many products.[35] Reverse-notifications eventually became a regular feature of GATT work on which a number of 'inventories' of non-tariff barriers on agricultural and industrial products were developed and proved crucial in the identification of problems and the development of new disciplines in this area (Santana and Jackson, 2012).

2.2.3 The 1970s and 1980s

New notification requirements were introduced and refined in the 1970s as a result of recommendations by various working parties and other regular bodies of the GATT. For example, a notification on 'border tax adjustments' was introduced in 1970 as a result of a recommendation by a Working Party.[36] In 1971, contracting parties introduced a questionnaire on import licensing[37] that was then complemented with an annual notification of 'changes' to the information contained in a consolidated compilation of the responses.[38] A similar decision required parties of the Joint Working Group to annually notify changes in respect of the 'residual restrictions'.[39] Revised notification procedures were agreed for the ad hoc examination of customs unions and free trade areas under XXIV:7(a).[40] In 1983, the Committee on Trade in Agriculture adopted a work programme that invited contracting parties to supply information on trade measures affecting these products based on an agreed format.[41] The Executive Secretariat also started playing a role by sending annual reminders of the notification requirements.

An extensive change in the notifications landscape resulted from the conclusion of the Tokyo Round, which embodied a number of plurilateral agreements. Some of these aimed at tackling problems affecting specific sectors (e.g. bovine meat and dairy products),[42] and included provisions to allow for 'information and

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33 BISD 12S/47.
34 GATT/AIR/343.
35 TN.64/NTB/8 of 15 November 1964.
36 BISD 18S/108. See also L/3389.
37 L/3515 of 23 March 1971.
38 See report by the Committee on Trade in Industrial Products in L/3756, para. 76. See also SR.28/2 and L/4598.
39 This decision was reaffirmed in March 1980. See C/M/139 an L/5090.
40 BISD 19S/13.
41 BISD 30S/12. Information was compiled and circulated in the AG/FOR/ series.
42 Arrangement regarding Bovine Meat (BISD 26S/84) and International Dairy Arrangement (BISD 26S/89).

market monitoring' based on statistics to be supplied by participants. Six other plurilateral agreements, often referred to as the 'Tokyo Round codes', disciplined the use of specific non-tariff measures.[43] Three of these aimed at interpreting and improving the disciplines that were already covered by the GATT (i.e. subsidies and countervailing duties, anti-dumping, and customs valuation), while the other three introduced new disciplines in previously unregulated areas (i.e. standards, government procurement and import-licensing procedures).

   All these new legal instruments incorporated specific provisions that required the notification of certain aspects, some of which were intended to play a different role than the other notifications thus far. For example, instead of requiring the notification of measures that had already been adopted, the TBT Code required the notification of 'proposed' technical regulation or standards not based on an international standard, with a view to giving other contracting parties a say in the formation of those measures. Like in the case of the agreements on bovine meat and dairy, Article VI:9 of the Government Procurement Code required participants to collect and provide to the Committee on an annual basis detailed statistics on their purchases. Another new development that took place in the context of these plurilateral agreements was the agreement of notification 'formats', such as the one agreed by the Committee on Technical Barriers to Trade.[44]

2.2.4   *The need for a systemic approach*

Following the conclusion of the Tokyo Round in 1979, contracting parties felt that a comprehensive approach was required to improve the notifications and surveillance function of the GATT. An 'Understanding regarding Notification, Consultation, Dispute Settlement and Surveillance' was adopted on 28 November 1979, which invited contracting parties to notify 'to the maximum extent possible' the adoption of trade measures affecting the operation of the GATT. It also stated that notification should preferably be done prior to implementation of new measures or, if not possible, 'promptly *ex post* facto'. In terms of the surveillance function, contracting parties agreed to conduct a regular and systemic review of developments in the trading system. To this end, they held discussions based on a biannual publication by the Secretariat entitled 'Developments in the Trading System', which was based not only on country notifications, but also on other official and unofficial sources collected independently by the Secretariat.[45]

   In 1980, the Director-General of the GATT put forward a proposal to improve notifications, which listed all the requirements and a calendar in which they were due.[46] This proposal, which was adopted in March 1980, made a difference between the notification requirements applicable to all contracting parties and

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43   The Decision of 28 November 1979 stated that contracting parties' rights and obligations of those who were not parties to those agreements would not be affected. L/4905.

44   TBT/W/35 of 17 July 1981.

45   See, for example, L/5915, L/6205, L/6087, L/6205, L/6289, L/6366, L/6435, and L/6530.

46   C/111 of 14 March 1980.

those that were applicable only to some of them (e.g. because the obligation was contained in protocols of accession, the enabling clause, the multifibre agreement, waivers, the Tokyo Round Codes, etc). It is interesting to note that, out of the approximately 21 notifications that were applicable to all contracting parties, only five were periodic in nature (i.e. those relating to subsidies, state-trading, marks of origin, licensing and Part IV of the GATT) and 16 were required on an ad hoc basis (i.e. following the introduction of a measure or to initiate specific procedures).[47]

   In spite of these efforts, contracting parties considered that it was necessary to keep improving and streamlining the notification procedures on the basis of a series of reports on 'notification and surveillance'.[48] In 1984 and 1985, the Secretariat circulated notes which identified what, in its opinion, were the three main basic purposes of notifications: (1) to assist in the surveillance of developments in the trading system; (2) to meet obligations under the plurilateral agreements or to provide documentation under the GATT work programme, and (3) to show whether individual contracting parties were fulfilling their obligations under the GATT.[49] Moreover, the Secretariat considered that the situation could be improved if contracting parties agreed to: (1) provide for more regular and complete notifications, which were considered the most authoritative source of information; (2) make greater use of 'reverse' notifications; (3) authorise the Secretariat to gather information from official and unofficial sources;[50] and (4) deal with measures in the 'grey area'; i.e. measures that were disciplined by the GATT, but lacked an express notification requirement. Although some contracting parties endorsed these suggestions, others were concerned by the additional burden they could represent to governments.

2.2.5 *Discussions during the Uruguay Round*

Based on the preparatory work that had been carried out in the previous years,[51] a Negotiating Group on Functioning of the GATT was tasked in 1987 to deal with the notifications. Discussions in the context of the preparatory committee had concluded that: (1) There was a widely held view that there was scope for improvement and streamlining of the notification requirements and procedures; (2) efforts should be made to reduce and simplify the large number of existing notifications so as to avoid unnecessary duplication and make it easier for

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47 C/W/471 of 22 May 1985, Tables 1 and 2. A subsequent report by the Secretariat considered there were only four period notifications applicable to all contracting parties. See PREP.COM(86)W/31/Add.1.

48 See, for example, C/W/349, C/W/361, and C/W/385.

49 See C/W/446 and C/W/471.

50 Contracting parties decided in 1983 to include, in the documentation prepared by the Secretariat for the reviews by the Council, not only actions notified by participants, but also trade measures or agreements which had not been notified. See document C/M/169, 10 August 1983.

51 The Secretariat prepared an expanded listing of notification requirements to include areas not previously covered by the Council's reviews (MTN Codes, MFA, 1979 Understanding and 1982 Work Programme). See PREP.COM(86)/W/31/Add.1.

participants to comply with them; (3) a permanent body should be established to carry out regular reviews of trade and trade-related policies of individual participants, possibly to be called the Trade Policy Committee; and (4) there was a need for further discussion on the question of improvement of the GATT machinery for notifications which would need to be continued on a long-term basis.[52]

During the Uruguay Round discussions, several proposals were tabled that aimed at improving the notifications system by, inter alia, introducing a general requirement to notify,[53] developing common formats to be used, having a central repository of notifications,[54] and requiring the notification of trade measures affecting the operation of the GATT before they were put into force. Some contracting parties considered that improved notifications and surveillance could allow for earlier consultations, which could in turn prevent disputes from arising.[55] In terms of the surveillance function, some considered that a separate trade policy review mechanism could significantly improve the situation.

The launch of the Uruguay Round also led to new notifications. As part of the mechanism for surveillance of the 'standstill' and 'rollback' commitments that were part of the Punta del Este Declaration,[56] a Surveillance Body was established. Reverse notifications could be made to this body based on an agreed format[57] which would then be discussed. Approximately 30 alleged violations of the standstill provision had been notified and reviewed by the Surveillance Body as of 1993, together with more than 20 notifications relating to the rollback commitments.[58] Similarly, following a recommendation by the Group on Quantitative Restrictions and Other Non-Tariff Measures, a study was undertaken to assess the feasibility of developing an 'Integrated Database' (IDB) that would seek to establish a link between the work relating to QRs and NTMs with tariff and import information that was notified by the contracting parties.[59] The submission of tariff and import information was born out of the 'tariff study' that was carried out at the beginning of the 1970s to assess the results of the Kennedy Round. This information was also used by the Secretariat during the Tokyo Round to produce four volumes known as the 'Basic Documentation for the Tariff Study'.[60]

The Uruguay Round resulted in a massive change in the notification requirements. Not only were many of the plurilateral Tokyo Round Codes made part of the single undertaking, but also new agreements in areas such as services, trade-related aspects of intellectual property, rules of origin, pre-shipments inspection, etc became part of the WTO framework. As it will become evident in

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52   Document PREP.COM(86)W/31.
53   MTN.GNG/NG14/8.
54   MTN.GNG/NG14/W/39.
55   MTN.GNG/NG13/W/14/Rev.2 of 22 June 1988, p. 6.
56   See MTN.GNG/NG14/W/3, MTN.TNC/2, and MTN.GNG/5.
57   MTN.SB/SN/.
58   MTN.SB/W/3/Rev.14 of 16 August 1993.
59   L/6073 of 27 October 1986.
60   IDB/URM/1 of 19 April 1994.

the following section, the considerable diversity of the notification requirements under the WTO is a legacy of the wide range of objectives and methodologies that were slowly developed in the GATT.

2.3   THE NATURE AND SCOPE OF WTO NOTIFICATIONS

The results of the Uruguay Round included a Ministerial Decision on Notification Procedures which contains three sections: the first affirms Members' commitments to their obligations regarding publication and notification; the second one establishes a central registry of notifications within the WTO Secretariat; and the third provides that 'the Council for Trade in Goods will undertake a review of notification obligations and procedures under the Agreements in Annex 1A of the WTO Agreement'.[61] A Working Group on Notification Obligations and Procedures was established in 1995 with the mandate to make recommendations and undertake a 'thorough review of all existing notification obligations of Members established under the Agreements in Annex 1A of the WTO Agreement, with a view to simplifying, standardizing and consolidating these obligations to the greatest extent practicable, as well as to improving compliance with these obligations, bearing in mind the overall objective of improving the transparency of the trade policies of Members and the effectiveness of surveillance arrangements established to this end, and also bearing in mind the possible need of some developing country Members for assistance in meeting their notification obligations'.[62]

The WTO framework contains more than 200 different legal notification requirements, the large majority of which relate to NTMs.[63] This section examines the elements that differentiate the current notification requirements in order to show their diversity. It then compares the coverage of notifications with the universe of NTMs covered by the most widely used classification of NTMs.

2.3.1   Self versus reverse notifications

While a vast majority of requirements oblige Members to provide information on their own policies, some are 'reverse' notifications, which allow them to identify measures imposed by third countries. Article 5.5 of the Agreement on Import Licensing Procedures, for example, invites 'interested' Members who consider that another Member has not notified the introduction of a licensing procedure to bring the matter to the attention of such a Member. If a notification is not made promptly thereafter by the Member maintaining the measure, the complaining

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61   G/NOP/W/1.

62   G/C/M/1.

63   Most of the notifications have been attributed a document symbol, which means that they are circulated. One example of notifications that are not circulated is those on quantitative restrictions, presumably for confidentiality reasons. Other notifications relate to Agreements that have been terminated such as the Agreement on Textiles and Clothing, the plurilateral International Bovine Meat Agreement or the International Dairy Agreement.

Member may then notify the licensing procedure itself. Another example is Article 12:8 of the Agreement on Safeguards which states that any Member may notify measures 'that have not been notified by other Members that are required by [the Agreement on Safeguards] to make such notifications'. These specific reverse notification possibilities are complemented by the 'Decision on Reverse Notifications of Non-Tariff Measures' which opens the possibility for Members to make notifications of non-tariff measures maintained by other Members 'in so far as such measures are neither subject to any existing WTO notification obligations nor to any other reverse notification possibilities under the WTO Agreement'.[64]

2.3.2 Periodicity

Notifications also differ from each other with regard to their periodicity (see Figure 2.1). Most of those covering laws and regulations are one-off requirements with a separate obligation to notify changes thereafter. The notifications that provide information on the measures themselves typically take two different forms: they are either ad hoc or (semi-) annual. Depending on the objective of the notification (see below), measures need to be notified either early on at the project stage, or promptly after their introduction. In the latter case, they often also need to be notified in a semi-annual or annual summary report. The case of anti-dumping is illustrative of this sort of multiple notification requirements. Article 16.4 of the Agreement on implementation of Article VI of GATT 1994 requires that:

> Members shall report without delay to the Committee all preliminary or final anti-dumping actions taken. Such reports shall be available in the Secretariat for inspection by other Members. Members shall also submit, on a semi-annual basis, reports of any anti-dumping actions taken within the preceding six months. The semi-annual reports shall be submitted on an agreed standard form.

2.3.3 Product-specific information

About half of the notification requirements cover NTMs that typically apply to specific products. In those cases, notification templates generally require Members to indicate which products are covered. The other half relates to measures (e.g. laws and regulations) that affect, or could potentially affect, all products (e.g. pre-shipment inspection or customs valuation).

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64   Decision of 1 November 1995, G/L/60.

Figure 2.1 *Types of notifications*
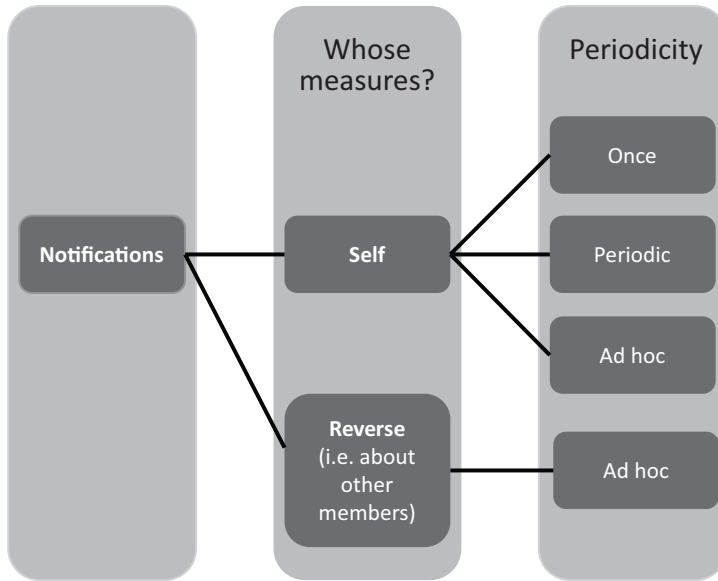
2.3.4 *NTMs covered by the notifications*

Current notification requirements cover 24 broadly defined subject areas ranging from agriculture to preferential trade agreements.[65] Some of those subject areas would not enter the definition of NTMs. There are six notification requirements that enter in this category, including those on regional trade agreements under GATT Article XXIV, three on preferential trade arrangements under the Enabling clause, four on tariff renegotiations under GATT Article XXVIII, and tariff and trade data for the Integrated Database (IDB). The subject areas sometimes cover more than one specific measure. Agriculture, for example, covers five NTMs: the special safeguard, tariff quotas, export restrictions, domestic support and export subsidies. Also, in many cases a single measure is covered by several different notification requirements. For instance, there are five notifications on anti-dumping: two which relate to the introduction of anti-dumping measures (one on an ad hoc basis, and the other one in the form of a semi-annual summary) and three which relate to anti-dumping legislation and regulations, as well as authorities and procedures.

As mentioned, reverse notification possibilities cover, in principle, the whole spectrum of NTMs. However, the 'self' notification obligations only cover a large,

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65 The 24 subject areas are: agriculture, anti-dumping, balance-of-payments, customs valuation, enabling clause, government procurement, import licensing, TRIPS, import restriction (Art. XVIII), TRIMS, maritime transport, reverse notifications, pre-shipment inspection, quantitative restrictions, PTAs, rules of origin, safeguards, SPS, state trading, tariffs, subsidies and countervailing duties, technical barriers to trade, textiles and clothing, services.

non-exhaustive, share of the NTMs universe. This can be seen by comparing the list of notifications with the so-called 'Multi-Agency' classification (MAC) of NTMs (see Table A2.1). The MAC comprises 16 broad categories of measures, of which only 3 do not seem to be covered at all by WTO notification requirements. Those are: finance measures, distribution restrictions and restrictions on post-sales services. All the other categories are at least partly covered (i.e. a number of subcategories are covered while others are not). This would be the case, for example, of price control measures, of which 5 subcategories (administrative pricing, voluntary export price restraints, anti-dumping measures, countervailing measures, and safeguard duties) are covered by notifications while two (variable charges and seasonal duties) are not.[66]

It should, in addition, be noted that where notification requirements broadly match NTM categories, they do not necessarily cover the measures that could be classified therein. For example, in the case of sanitary and phytosanitary measures, Article 7 and Annex B of the SPS Agreement require governments to notify new SPS measures which are not based on international standards and have a significant effect on trade of other Members, and to notify those at an early stage, that is, when amendments can still be introduced. Measures that were in place before the entry into force of the SPS Agreement need not be notified, nor is there an obligation to notify the final measures when they entered into force. This means that some of the measures in place were not notified and that some of those notified may have been amended before being implemented or even not implemented at all.

2.4   The quantity and quality of notifications

This section examines the extent to which notifications requirements are observed by WTO Members in practice. More precisely, it examines, on the one hand, whether Members comply with their commitment to notify certain information to the WTO Secretariat and, on the other hand, whether the information received through notifications could be used to measure the incidence of NTMs in international trade.[67]

2.4.1 The metrics of compliance

Answering the compliance question requires a detailed analysis of notifications by subject area, which has not been done in the past, or at least not systematically or regularly. Although it is tempting to assume that compliance is a straightforward

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66 Seasonal duties may be notified as tariffs.
67 This approach is not new. It was proposed by India in a communication for the General Council in 2009 (WT/GC/W/605 of 3 July 2009) which suggested 'the setting up of a project to enhance the Integrated Database to include in an appropriate format non-tariff data, based on the current notification obligations under WTO Agreements. … optimising the design and structure of present notification systems; enhancing co-operation with related multilateral agencies; and providing technical assistance to developing countries, in particular the LDCs.'

exercise in the case of one-off and periodic notification requirements, a closer inspection reveals that this is not always the case. The difficulties faced in this analysis relate to the nature of the requirements where, even if notifications are made, it is not always possible to establish whether all measures had been notified. Where Members are required to notify a periodic summary, one can assume that it encompasses all relevant measures and, therefore, that it covers all the measures falling under the requirement. For Members who do not submit a summary report, however, the question remains as to whether they did not have any relevant NTMs for the reporting period or if they simply did not comply with the notification requirement. The compliance problem is more pronounced in the case of ad hoc notification requirements which seek the reporting of new measures, as there is no real benchmark that could be used to determine if the Member did not fulfil its commitment and one has to fully rely on the reporting performance of Members.

Table A2.2 in the Appendix provides an overview of the performance of WTO Members in complying with their notification obligations. It is based on a selection of requirements which can be linked to the NTM classification and provide the most comprehensive information on NTMs in their respective subject areas. The measures/requirements not covered by the table relate, in general terms, to the notification of laws and regulations, contact points and changes thereof. In two cases, Pre-shipment inspection and Rules of Origin, only one time general notifications of laws and regulations are required.

There are many cases where Members have no obligation to notify if they do not have a certain NTM in place (i.e. there is no obligation to report the non-application of measures). This concerns all the ad hoc reporting, as well as TRQs for agricultural products and anti-dumping and countervailing duties notifications. In all other cases Members are required to notify both if they have introduced and if they do not have in place the measure concerned. There are also provisions requiring Members to make a one-off notification that no measures exist until such time when they may be introduced (e.g. anti-dumping).

Even if one focuses on the selective list of notification requirements, the compliance record does not look very strong, except for the one-off notifications for which by now, 15 years after the establishment of the WTO, a fairly high percentage of Members have provided information.[68] In the case of anti-dumping and countervailing duties one can assume that a fairly high percentage of measures are captured because these measures are clearly not used by all Members and proceedings in the WTO need to be undertaken to give them a justification under WTO rules. To the extent this is accurate, one could interpret that the lack of reporting is, in most cases, reflecting the non-application of such measures. Other measures, in particular SPS, TBT and import-licensing measures, are most likely more widespread than what notifications show.

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[68] WTO now counts 153 Members but for notifications the EU and its Member States count as one just as Switzerland and Liechtenstein do. Full compliance therefore equals 126 notifications.

The issue of compliance was taken up in February 2009 by the Chair of the General Council in a letter to all relevant WTO committees. The initiative was taken up again in the Trade Policy Review Body meeting in January 2010 on the monitoring of the recent trade developments,[69] where delegations stressed the importance of improving the record of notifications to various WTO Councils and Committees. It was suggested that the issue of enhanced notification should remain a focus in each of the relevant WTO bodies.[70]

One last point that needs to be taken into account when discussing compliance and its measurement relates to situations where a principal NTM is implemented through another NTM, both of which have to be notified at least once to the WTO. For example, TRQs for agricultural products, which need to be notified to the Committee on Agriculture, are often administered through some form of import licensing procedure, which needs to be notified to the Committee on Import Licensing and the QR notification. Likewise, import licensing is often a side measure associated with SPS and TBT measures. This means that import licensing may simply be a 'secondary' measure supporting the principal measure. If such secondary measures are reported separately, as is foreseen in the notification requirements, this creates problems of double counting which would need to be addressed when some kind of aggregation of measures across different subject areas is undertaken.

2.4.2 *Measuring NTMs through WTO notifications*

This subsection focuses on the notification formats which define to a large extent the kind of information that is expected from Members. It should, however, be stressed that the diverse formats of the different notification requirements make it difficult to assess their usefulness for the measurement of NTMs.

A first question that needs to be answered in this respect is what shall be defined as the 'unit of measurement' for the purposes of measuring NTMs. Only once such a unit of measurement and associated criteria are defined can one assess to what extent the existing notification formats satisfy them and could, therefore, be used for a quantification of the incidence of NTMs.

2.4.3 *Information needed to measure NTMs*

Several key information requirements are needed in order to identify an NTM unit of measurement that would allow us to assess the incidence of NTMs in international trade, including:[71]

• The subject area of the measure.

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69 WT/TPR/OV/M/7 of 3 March 2010.

70 The decision on improved tariff data collection and dissemination referred to in the introduction was one of the outcomes of this initiative.

71 The 'severity' of a measure is not addressed, neither is the specific way in which it is implemented, which in itself can have an effect on trade flows.

- The Member(s) imposing a measure.

- The Member(s) (potentially/actually) affected by the measure.

- The product(s) covered by the measure.

- The time period in which the measure is applied, potentially affecting trade flows.

The most easily identifiable pieces of information are the Member imposing the measure and the subject area. Unless the information relates to a 'reverse' notification where the imposing Member is unclear, there is never a doubt in 'self' notifications as to who is imposing the measure because it is the Member reporting it. The degree of precision for the other three information requirements can vary considerably.

   The product coverage of the NTM is also a key piece of information, because it determines whether particular tariff lines are affected by it. Most NTM notifications provide some kind of description of the products covered by the notification and the remaining ones can normally be considered to be applicable to all products. While textual descriptions are often quite specific and provide useful information on the product coverage, HS codes are of enormous analytical value for the screening and analysis of large numbers of notifications, as well as for estimating their impact on imports (e.g. the trade effect of the measure). Unfortunately, notification formats for WTO NTM notifications have rarely included the provision of HS codes as an obligatory element of information to be provided.

   The time dimension is also important. In order to assess the incidence of NTMs over time it is crucial to know when measures entered into force (i.e. a 'start' date) and when measures are discontinued (i.e. a 'stop' date). Ideally one would want to track these measures with exact dates provided by Members themselves, which thus far is possible only in the case of notifications on anti-dumping and countervailing duties. In the absence of exact dates, it is probably sufficient to know whether a specific NTM is in force at a given point in time. The assumption could then be that this measure was introduced since when the last notification was made.

2.4.4 Do existing notification requirements provide this information?

The precision with which information is provided varies considerably across notifications and even when enough precision is required in the format, the information is not notified by the Members. This means that it is often necessary to interpret and to make assumptions if one wants to process, summarise and present the information.

   Anti-dumping provides an example of a very precise notification procedure which satisfies most of these elements. Anti-dumping measures are reported

by Members in semi-annual reports with very specific information as to which Member is affected by the measure, which products are concerned (defined textually and at HS 6-digit level) and the exact dates when the measure was initiated, put in force and at some point terminated, as appropriate.[72]

The opposite is the case of the TBT notification requirements where the information elements are of little use for measuring NTMs. For example, the affected Members are usually not specified, because measures are meant to apply to all imports irrespective of their origin. The products concerned are sometimes described vaguely (e.g. 'textile products'), which may be at least partially explained by the nature of the measures at issue (e.g. technical regulations, standards, conformity assessment procedures which are often defined by regulators who did not take into account the HS coding system in drafting the measures). Last, but not least, the time dimension is for the most part left open. Because these notifications submit draft proposals of future technical regulations or conformity assessment procedures, the final published measure need not be notified, thus making it unclear whether, and if so when and how, such draft measure entered into force. For the measures that are put into force, there is no requirement to notify when they were terminated. Moreover, in cases where a 'revised' measure replaces fully or partially an older measure, the change is often not traceable, which could potentially lead to double counting.

2.4.5   Can the situation be improved?

It should be evident from the description above that current TBT notifications do not meet the basic criteria needed for measuring the incidence of NTMs. The situation is similar in the case of SPS notifications, which becomes a major issue if one takes into account that both of these account for the bulk of WTO notifications. The question then arises as to whether the situation can be improved in any way.

Changing the notification formats would, evidently, be the most straightforward approach to redress this problem. This solution, however, would require that the formats are discussed and approved by Members in each of the Committees concerned, which would take time and require consensus.[73] Moreover, it is possible that the fulfilment of the main objective of some of those notifications does not require the provision of some of the five basic elements described above, which may translate in incomplete notifications or a delay in their preparation.

The question then arises as to whether the measurability of such 'imperfect' notifications could be improved by complementing and categorising the officially submitted information of today. We believe that it could partially be done. For example, the information gaps could be filled by making assumptions

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72 The relatively precise recording of HS coding information, 'for reference purposes only', was only introduced in 2008 (see G/ADP/1/Rev.1 of 3 November 2008). The original reporting format did not mention the provision of HS codes.

73 It is also unlikely that a change to the format would be made retro-active in the sense that Members would not be required to provide information covered by past notifications.

on the likely dates for the implementation of a measure and/or by interpreting product information for product detail in HS codes. Another approach would be to complement notifications with other sources of information, as for example is done in the case of Trade Policy Reviews or the Monitoring exercises which were launched in 2009.

Table A2.3 in the Appendix tries to depict the extent to which current notification formats provide the five elements described above. The two main areas to look at are the dates and the product coverage as the information on the affected countries is often not relevant because most measures are applied on an MFN basis.

2.5 Notifications as a source of information on NTMs

2.5.1 *Challenges facing current WTO notifications*

As explained in Section 2.2, the nature and role of notifications in the multilateral trading system have evolved since the early days. In a 1984 note, the GATT Secretariat listed what it considered to be the three main basic purposes of notifications: (1) surveillance of developments in the trading system; (2) implementation and operation of the agreements by meeting obligations under the plurilateral agreements or by providing documentation under the GATT work programme, and (3) enforcement of the commitments by showing whether individual contracting parties were fulfilling their obligations under the GATT. This, obviously, does not mean that new purposes have not developed over time.

Under the WTO, notification requirements are part of the system put in place to allow Members and the organisation to fulfil its various functions. Notifications, therefore, continue to help with the implementation and operation of the agreements, as well as the enforcement of commitments. More precisely, 'self' notifications have typically been assigned one or more of the following roles:[74]

- Review the implementation and operation of commitments (e.g. agricultural tariff quotas, anti-dumping).

- Enable other Members to evaluate the trade effects and to understand the operation of a measure (e.g. subsidy programmes).

- Trigger the initiation of certain procedures (e.g. BOP).

- Trigger negotiations or consultations with Members affected by a measure (e.g. modification of schedules).

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74 Since the WTO makes the immense majority of this information available to the general public (Decision of 14 May 2002, 'Procedures for the circulation and derestriction of WTO documents', WT/L/452), one could argue that notifications also have the role of providing relevant information to traders thereby assisting in trade promotion.

- Provide transparency on the laws, regulations and other measures that could affect trade, including amendments therein (e.g. PSI, import licensing, QRs).

Certain notifications, however, also play other, different roles such as to:

- Allow other Members to participate in the formation of new regulations (e.g. SPS, TBT).

The extent to which notifications play the role they have been assigned in a satisfactory manner depends, among others, on compliance and quality of notifications made by Members. As discussed in Section 2.4, compliance appears to be generally low, except where Members have an own interest in complying with the requirement to trigger a procedure (e.g. modification of schedules). Also in a number of cases, the quality of notifications varies substantially, notably in terms of completeness and/or timeliness. Where compliance and/or quality are low, notifications cannot, by definition, play their roles in a satisfactory manner and may distort the way in which the application of a measure is perceived. The nature and extent of the problem may depend on the objective of the notification. When a Member fails to notify an SPS or TBT measure or notifies it too late, other Members are not given an opportunity to comment and influence the drafting of the measure. In other cases, such as subsidies and other beyond-the-border measures, notifications could significantly enhance transparency. The effects of a subsidy that is not notified may not be easy to identify even if the subsidy affects trade.

Low compliance may not only create a disincentive to notify, but also distort the perception about a particular NTM. It is reasonable to assume that low compliance with notification requirements may end up encouraging non-compliance (e.g. why bother if nobody else does it?). Where there is no obligation to notify the absence of a measure, a 'no notification' may be interpreted as 'no measure', in which case the Members that notify may look like they are the only ones using it.

While the ideal would clearly be to have in place a system where all Members fully comply with all notification requirements, the long history of discussions on approaches to improve compliance strongly suggests that this is a difficult endeavour. As mentioned above, low compliance was already seen as a problem in the GATT (see Section 2.2). A note by the Executive Secretariat of the GATT on the improvement of notifications procedures suggests that: 'Successive reviews by the Council in its special meetings have shown that some governments take a much stricter view than others of their obligations to notify.'[75] Over the years, many of the committees have, sometimes repeatedly, attempted to raise the level of compliance.

Part of the reason for the low compliance appears to be difficulties faced by Members in making their notifications. In the case of subsidies, for example,

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75 C/W/466 of 28 September 1984, para 6.

where the level of compliance is generally very low, a note from the Chairman of the SCM Committee summarising the replies to a questionnaire observed that the difficulties faced by Members were either logistical or of a more substantive nature.[76] Members identified two main types of logistical problems: resource constraints (staff and information) and lack of internal government coordination. On the substantive side, two main issues were mentioned: doubts concerning the key subsidy concepts involved and difficulties in interpreting and organising information and data to fit within the existing notification format. To the extent this assessment is accurate, the best way to address these difficulties would be through a combination of measures aimed at streamlining information-gathering and compilation processes, as well as at simplifying and clarifying notification formats and making them more flexible. Technical assistance may be necessary for low-income countries.

Logistical and substantive difficulties, however, may not be the only reason behind the lack of compliance. In some cases, the problem may be that governments have no strong incentive to comply. In the absence of any sanction for non-compliance, the only enforcement mechanisms are either self-interest or peer-pressure. Members clearly do not consider that notifications are always in their self-interest and tend to perceive them rather as a burden. They may not notify for fear that the information could be held against them. Because reverse notifications have practically disappeared in the WTO, the threat of peer pressure may have also weakened. Moreover, as mentioned before, where notification compliance is low, peer pressure is largely limited to raising specific trade concerns at the committees, and some governments don't see why they would notify when the others don't. Reinforcing the incentives to notify should probably involve a combination of sticks and carrots.

2.5.2   *WTO notifications could do more*

Beyond the question of what could be done to improve the efficiency with which notifications fulfil the role they are meant to play, it is interesting to consider whether they could also play other roles. For example, the WTO system could use information on NTMs for a number of other reasons than those discussed so far. First, information on NTBs faced by exporters is often needed for negotiation purposes. As mentioned in Section 2.2, under the GATT and more recently as part of the DDA negotiations, information on NTMs was collected specifically for negotiation purposes. For example, paragraph 16 of the Doha Ministerial Declaration mandated Members to establish negotiations to reduce or as appropriate eliminate non-tariff barriers (NTMs), in particular on products of export interest to developing countries. Like in the previous rounds of negotiations, the Negotiating Group on Market Access worked up until December 2005 on a process of identification, categorisation and examination of NTBs based on reverse notifications, with a view to ultimately negotiating

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76   See G/SCM/W/546/Rev1 of 16 April 2010 and G/SCM/W/505 of 27 March 2002.

appropriate solutions for them. These reverse notifications were compiled by the Secretariat in an inventory in which 18 Members notified the measures affecting their exporters. Given that this first set of notifications had a number of problems, including lack of specificity, Members requested the Secretariat to prepare a revised format to allow for the standardisation and classification of submissions received. Twenty-one Members submitted or resubmitted notifications under the revised format.[77]

There are several reasons why regular notifications do not provide the sort of information on NTMs that Members need for negotiations purposes. First, self-notifications which have come to dominate the universe of notifications, are not well suited to provide information on NTMs acting as barriers. One would expect governments not to be very keen to provide information on measures that they impose with the effect of restricting imports. Reverse notifications are clearly better suited for this purpose. As discussed in Section 2, however, reverse notifications have progressively lost their importance under the WTO. And while WTO Agreements still include a number of provisions allowing for reverse notifications, they remain largely unused. One reason for this may be that at least part of their role has been taken over by the 'special trade concerns' mechanism used in certain WTO bodies (e.g. the SPS and TBT Committees), which allows exporting Members to raise issues faced on foreign markets. Second, notifications typically provide information on NTMs that are already regulated while negotiators may be more interested in information on measures that are not yet regulated.

A second purpose for which Members need NTM information is for surveillance and monitoring. A complete description of a Member's trade and trade-related policies, such as the one periodically performed by the Trade Policy Review Mechanism, would include information on a large number of NTMs. Similarly, to document trends in trade policies, it is important to extend beyond tariffs and other well-documented measures. Existing notifications at least partly serve a surveillance purpose. Notifications of contingent measures for instance can be seen as part of a surveillance mechanism. The recent initiatives aimed at monitoring trade and trade-related policy developments in the context of the global financial and economic crises, however, suggest that notifications are not sufficient for monitoring and surveillance purposes. This is mostly because notifications are often made with a relatively long lag, but also because of the limited (or lack of) compliance affecting most of them.

Thirdly, information on NTMs is needed for analytical and research purposes. The quality and reliability of empirical research critically depends on the quality of data used. For example, the coverage should ideally be comprehensive. Low or partial coverage of certain measures (e.g. SPS or TBT notifications which do not cover pre-WTO or final measures) would be an issue if one is interested in quantifying the effect of NTMs or in making international comparisons based

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77 TN/MA/W/46 and addenda.

on that information. Confidentiality and accessibility of the data could also raise problems.

All this means that, unless the scope of many notifications is expanded, and compliance and quality are enhanced, WTO notifications will remain an insufficient source of information on NTMs, which means that the trade policy community will have to rely on other sources of information in the short and medium term. As mentioned above, notifications serve certain specific purposes and their information requirements are designed to serve them. They would serve those even better if compliance and quality were improved. Compliance with notification requirements and improved quality of the notifications may also have positive spill-over effects, raising domestic awareness of the existence of measures that restrict home firm competitiveness.[78] Notifications, however, are often an inappropriate source of information for negotiators simply because they were not meant to serve that role. They are also mostly inappropriate when it comes to monitoring and surveillance. Similarly, their contribution to the transparency of the trading system remains limited. In this particular case, not only compliance but also the scope of notifications and the formats which specify exactly what Members need to notify would need to be revised if notifications are to become the main source of information on NTMs. Such changes would also help make the notifications data more relevant for researchers.

2.5.3 Tapping other sources of information

A number of other sources of information on NTMs exist which could be tapped with a view to improving transparency of trade and trade-related policies and fulfilling some of the objectives mentioned above. Some of them are internal WTO sources. These would include, for example, the records of discussions on 'specific trade concerns' in certain committees. At the end of 2010, more than 270 such concerns had been discussed in the TBT committee[79] and 290 in the SPS committee.[80]

Another major source of information on NTMs would be the reports prepared by the Secretariat and Members under the Trade Policy Review Mechanism. The Secretariat's Trade Policy Reports (TPRs) draw on notifications and other information available in the Secretariat but also, critically, on additional information provided by the Member under review. TPRs are prepared every two years for the four Members with the largest share of world trade; every four years for the next 16 Members by order of the size of their share of world trade and every six years for the remaining Members. They provide a comprehensive description of WTO Members' trade policies. They make a significant contribution to the transparency of the world trading system and may help identify issues for negotiations. However, because TPRs take the form of text and are not accessible

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78 It should be noted that other transparency instruments, such as trade policy reviews, which also cover procedural obstacles, probably play this role more efficiently.

79 G/TBT/GEN/74/Rev.6

80 G/SPS/GEN/204/Rev.10 and addenda.

in a searchable database, they are not well suited for international comparisons or for research and in particular for quantification. Moreover, the information produced in those reports is not compiled systematically, which means that processing information across countries is usually a burdensome endeavour. The four- to six-years periodicity that applies to most Members could also limit the use of TPRs for time series and comparative work (i.e. because the information for any two given Members is most likely for different years).

Other WTO sources of information include the reports prepared by the WTO Secretariat in the context of the global financial and economic crises. There are two such reports. The first is a report on trade and trade-related developments prepared periodically for the Trade Policy Review Body.[81] The second series of reports is prepared by the WTO Secretariat together with the secretariats of the OECD and UNCTAD following a request by the G20 to monitor trade and investment measures.[82] As already mentioned, the monitoring reports do not use information from notifications. Instead they use information collected through questionnaires sent to selected Members, informal reverse notifications and the press. The information collected is then submitted to the members for approval.

There are several sources outside of the WTO that could provide information on NTMs and, even if much remains to be done, there has been considerable progress in recent years both at the regional and at the multilateral level. In particular, as part of a project initiated by UNCTAD in 2006, a number of organisations have undertaken efforts to refresh the existing classification of NTMs and to significantly upgrade data collection.[83] An important contribution of this joint project was to update the old UNCTAD Coding System of Trade Control Measures which has been used by UNCTAD in collaboration with a number of regional organisations to collect and classify NTMs since 1994. In November 2009, a new classification was issued which includes new NTM categories and sub-categories.[84] From a WTO perspective, the classification is important because it determines the WTO relevance of information collected by other agencies. Conversely, to the extent that other agencies want to use information collected through notifications, it will be easier for them to do so if there is some correspondence between the classification and definitions used at the WTO. The WTO Secretariat has been actively involved in the process

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81   It is a preparatory contribution to the report by the Director-General that is called for in Paragraph G of the TPRM mandate and that aims to assist the TPRB to undertake an annual overview of developments in the international trading environment which are having an impact on the multilateral trading system. See WT/TPR/OV/W/1 to WT/TPR/OV/W/3 and WT/TPR/OV/1 to 13.

82   See, for example, the Report on G20 trade and investment measures (May 2010 to October 2010) dated 4 November 2010.

83   See UNCTAD (2010) and other contributions in this volume.

84   The November 2009 classification includes new sub-categories for 'sanitary and phyto-sanitary measures' and 'technical barriers to trade' as well as a number of new categories including 'export measures', 'trade related investment measures', 'distribution restrictions', 'restrictions on post-sales services', 'subsidies', measures related to intellectual property rights' or 'rules of origin'.

of further redrafting and elaborating the classification with a view to having a revised version.[85] This new version was issued in 2012.

Several organizations have also launched NTM data collection projects. UNCTAD and the International Trade Centre conducted a pilot project to collect information on NTMs in seven developing countries. These pilot projects aimed at testing the new classification as well as the data collection methodology based on firm surveys. Since the end of the pilot project in 2009, ITC carried out large-scale company level surveys on NTMs in more than a dozen developing and least-developed countries on all continents. In parallel, UNCTAD and ITC have also identified data sources and collected official data for some of the pilot project countries as well as for leading importing countries. It should be stressed that survey data is different in nature from data collected from official sources. Data based on complaints and concerns also cover so-called 'procedural obstacles', that is, obstacles arising from arbitrary, inefficient, costly, time-consuming, non-transparent or corrupt administration of policies. The problem is, however, that surveys are often not specific about the measures involved, are not systematic and may not always be reliable. As evidenced by the papers in this volume, the World Bank has also collected information on NTMs as part of a domestic regulatory-improvement agenda aimed at boosting home-firm competitiveness through improved access to inputs.[86]

2.6   CONCLUSION

As discussed, transparency in trade and trade-related policies is essential to the smooth operation of the multilateral trading system and notifications contribute to such transparency. Both compliance and the quality of information furnished by Members in the current notifications scheme are not stellar. This means that notifications may not always serve the purpose they have been designed to serve in a satisfactory way. It also means that, at least in the short run, the WTO is unlikely to provide a repository of information on all NTMs, that is, to be a comprehensive if not exhaustive source of information on NTMs. This poses a problem for the trade policy community, traders and researchers who are facing two possibly complementary options. First, and this may be the only option in the short term, other sources of information will need to be used to complement notifications, which could be either internal or external to the WTO. Secondly, Members could decide to expand and enhance the notification mechanisms. This would involve renewed efforts to improve compliance, as well as changes in the notification requirements and formats.

One issue that arises with the second option is of a systemic nature. Modifying notification requirements and improving compliance with a view to improving measurability and to better serving a transparency purpose would go a long

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85   For example, some of these new categories are only defined in general terms to allow the collection of information from the private sector through surveys. Before they can be used to collect official information, they will require further elaboration.

86   Note that access to some of the NTM information collected by the Bank may be restricted.

way towards addressing the various needs for NTM information. The lack of incentives associated with self-notifications schemes, however, may undermine efforts aimed at helping Members address non-tariff barriers that affect their exporters. To serve this objective, the WTO may need to resort to other schemes, such as: (1) reviving the reverse notifications, (2) expanding the specific trade concerns discussions (which seem to have largely replaced reverse notifications, or (3) systematically tapping other sources, which do not suffer from the self-notifications syndrome. Again, these sources could be internal to the WTO (e.g. the reports produced in the context of the TPR mechanism and other special reports such as the ones prepared in the context of the global financial and economic crises), or external. In this perspective, ongoing efforts by other agencies using business surveys to identify obstacles faced by exporters could play a useful role.

Beyond the compliance and quality issue, WTO notification requirements have traditionally served various purposes and the nature of the information they require Members to notify depends on the purpose they serve. The SPS and TBT notification requirements, for example, aim at allowing other Members to influence the regulations that Members plan to adopt. They do not require Members to notify regulations that pre-existed the entry into force of the SPS and TBT Agreements, nor the new measures in their final form. They, thus, only provide a partial coverage of these measures which may be insufficient from a transparency perspective. In the short run, the only way to fill those gaps is through the use of other sources of information that could complement the notifications. Other WTO sources may help fill some gaps but, in many cases, external sources will have to be used. From this point of view, the existing dialogue between the WTO and other agencies involved in NTM data collection efforts is crucial to maximise the complementarity between WTO and other sources of information on NTMs, as well as to avoid duplication of efforts. In this perspective, the WTO's new 'Integrated Trade Intelligence Portal' (I-TIP) will significantly facilitate interagency information sharing by providing a new unified point of access to all WTO NTM notifications. In the longer run, it may be possible to modify the format of certain WTO notifications and require additional or more specific information, such as for instance date of entry into force of SPS and TBT measures. In other cases, however, extending the scope of notifications beyond a certain limit may not obtain the necessary consensus among the WTO membership.

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APPENDIX

Table A2.1 *WTO notifications' coverage of NTMs by Multi-Agency Coding*

MAC code (2009)	Heading	Number of requirements	Periodicity	Coverage
A000	**Sanitary and phytosanitary measures**	1 (Agreement on SPS measures) + 1 (Agreement on licensing procedures)	Ad hoc	Changes in SPS measures not based on international standard and with significant effect on trade, at draft/project stage *Not covered: Pre-existing measures, final measures.*
B000	**Technical barriers to trade**	13 (Agreement on TBT) of which 4 on measures + 1 (Agreement on licensing procedures)	Ad hoc	New technical regulations (central, local and non-government level) and conformity assessment procedures not based on international standards and with substantial effect on trade, at draft/project stage. *Not covered: Pre-existing measures, final measures*
C000	**Pre-shipment inspection and other formalities**			See detail below *Not covered: other formalities n.e.s.*
C100	Pre-shipment inspection	2 (Agreement on PSI)	Once/ad hoc	Laws and regulations plus changes thereof *Not covered: implementation (no indication of prod. coverage)*
C200	Direct consignment requirements			*Not covered*
C300	Requirements to pass through a specified customs port			*Not covered*
C400	Import monitoring and surveillance requirements and other automatic licensing measures	5 (Agreement on import licensing procedures) of which 2 on measures	Ad hoc and annual	All new licensing procedures and changes thereof
D000	**Price control measures**	See details below	See details below	See detail below *Not covered: price control measures n.e.s.*

MAC code (2009)	Heading	Number of requirements	Periodicity	Coverage
D100	Administrative pricing	10 (Agreement on implementation of Article VII)		Customs valuation laws and regulation, implementation
D200	Voluntary export price restraints	2 (Agreement on safeguards) + 1 (AoA)	Once	VEPRs and other grey area measures
D300	Variable charges			*Not covered (some information in IDB)*
D400	Anti-dumping measures	5 (Agreement on implementation of Article VI) of which 2 on measures	Ad hoc and semi-annual	All preliminary and final actions
D500	Countervailing measures	3 (Agreement on subsidies and countervailing measures) of which 2 on measures	Ad hoc and semi-annual	All preliminary and final actions
D600	Safeguard duties	12 (Agreement on safeguards) and 2 (AoA) of which 10 on measures	Ad hoc or once	Special agricultural safeguard plus general safeguard (at all stages)
D700	Seasonal duties			*Not covered (some information in IDB)*
E000	**Licences, quotas, prohibitions and other quantity control measures**			See detail below *Not covered: other quantity control measures n.e.s.*
E100	Non-automatic licence	5 (Agreement on import licensing procedures) of which 2 on measures	Ad hoc and annual	All new licensing procedures and changes thereof
E200	Quotas	2 (Decision on notification procedures for quantitative restrictions) + 2 on (AoA) (+ 19 MFA)	Ad hoc and biennial/ ad hoc and annual	Quantitative restrictions and AG TRQs
E300	Prohibitions	Same as E200		
E400	Quantitative safeguard measures	Same as D600		

MAC code (2009)	Heading	Number of requirements	Periodicity	Coverage
E500	Export restraint arrangements	2 (Agreement on safeguards) (also cover VEPRs)	Once	VERs and other grey area measures
F000	**Charges, taxes and other para-tariff measures**			Bound ODCs are in tariff schedules
F100	Customs surcharges			*Not covered*
F200	Service charges			*Not covered*
F300	Additional taxes and charges			*Not covered*
F400	Internal taxes and charges levied on imports			*Not covered*
F500	Decreed customs valuations	10 (Agreement on implementation of Article VII)		Customs valuation laws and regulation, implementation *Not covered: implementation (no indication of prod. coverage)*
G000	**Finance measures**			*Not covered*
H000	**Anti-competitive measures**			
H100	Restrictive import channel	1 (GATT Article XVII)	Annual	State trading Not covered: other forms of restrictions on import channels
H200	Compulsory national service			Not covered (possibly some info notified under GATS)
I000	**Trade-related investment measures**	2 (Agreement on TRIMs) + 1 on maritime	Once / annual	Non-conforming TRIMs, maritime vessels
J000	**Distribution restrictions**			*Not covered (possibly some info notified under GATS)*
K000	**Restriction on post-sales services**			*Not covered (possibly some info notified under GATS)*

MAC code (2009)	Heading	Number of requirements	Periodicity	Coverage
L000	**Subsidies (excluding export subsidies)**	4 (Agreement on subsidies and CVMs) of which 1 on measures + 2 (AoA)	Annual / ad hoc and annual	All specific subsidies/ domestic support and AMS
M000	**Government procurement restrictions**	6 (GPA)		Laws and regulations of signatories *Not covered: non-signatories, implementation (no indication of prod. coverage)*
N000	**Intellectual property**	18 (TRIPS)		Laws and regulations plus changes thereof *Not covered: implementation (no indication of prod. coverage)*
O000	**Rules of origin**	4 (Agreement on rules of origin)		Laws and regulations plus changes thereof *Not covered: implementation (no indication of prod. coverage)*
P000	**Export related measures**			
P100	Export licence, quota, prohibition, and other QRs	2 (Decision on notification procedures for QRs) + 1 (AoA)	Ad hoc	Export restrictions on foodstuffs *Not covered: export restrictions on other products*
P200	State trading administration	1 (GATT Article XVII)	Annual	State trading
P300	Export price control measures			*Not covered*
P400	Measures on re-export			*Not covered*
P500	Export taxes and charges			*Not covered*
P600	Export technical measures			*Not covered*
P700	Export subsidies	3 (Agreement on subsidies and CVMs) + 1 (AoA)	Ad hoc / annual	Elimination of export subsidies / AG export subsidies

Notes: MAC code includes proposed draft revision.

Source: WTO Central Registry of Notifications and WTO legal texts.

Table A2.2 *Members reporting for some key WTO notification requirements*

MAC Code (2009)		Description of WTO notification	Periodicity	Number of Members with notifications					Notification even if no NTMs	Source of Member count
				Once	2006	2007	2008	2009		
A	A000	SPS	Ad hoc		47	40	50	48		SPS IMS
B	B000	TBT	Ad hoc		63	69	63	71		TBT IMS
C	C100	Pre-shipment inspection	Once	109	-	-	-	-	-	CRN
D	D400	Anti-dumping measures	Semi-annual		65	62	66	57		G/L/223/Rev.18
	D500	Countervailing measures	Semi-annual		60	55	56	52		G/L/223/Rev.18
	D600	Safeguard duties (initiation)	Ad hoc		9	5	8	11		DB on Safeguards
		Special safeguards (AG)	Annual		30	26	23	17	y	G/L/223/Rev.18
	D700	Seasonal duties (if in tariff notification)	Annual		87	95	92	93	y	Integrated Data Base
E	E100	Import licensing (incl. automatic)	Annual		46	37	31	42	y	G/L/941
	E200-E300	Quotas, Prohibitions	Biennial		9	5	12	8		G/L/223/Rev.18
	E270	TRQ (AG, import fill)	Annual		32	27	24	19		G/L/223/Rev.18
L	L000	Subsidies (excluding AG export subsidies)	Biennial		-	71	-	78	y	G/SCM/W/546/Rev.2
N	N000	Intellectual property	Ad hoc		10	8	20	10		CRN
O	O000	Rules of origin (non-preferential)	Once	80	-	-	-	-	-	G/L/939
		Rules of origin (preferential)	Once	125	-	-	-	-	-	G/L/939
P	P100	Export restrictions (AG)	Ad hoc		-	-	1	-	-	AG IMS
	P200	State trading (includes H110)	Biennial		36	-	35	-	y	G/L/934
	P700	Export subsidies (AG)	Annual		61	55	47	31	y	G/L/223/Rev.18

Notes: For legal requirement reference see Table A2.3. CRN = Central Registry of Notifications. - = not applicable.

Source: WTO documents or information management systems of the respective divisions as indicated in last column.

Table A2.3 *Precision of reporting for some key WTO notification requirements*

MAC Code (2009)		Description	WTO legal requirement	In force (no start)	Specific dates			Products	
					Initiation	Start	End	Descriptions	HS codes
A	A000	SPS	SPS Art. 7 Annex B		x	(x)		x	(x)
B	B000	TBT	TBT Art. 2.9 & 5.6		x	(x)		x	(x)
C	C100	Pre-shipment inspection	PSI Art.5	x					
D	D400	Anti-dumping measures	GATT 1994 Art. VI Art.16.4		x	x	x	x	x
	D500	Countervailing measures	SCM Art. 25.11		x	x	x	x	x
	D600	Safeguard duties	SG Art. 12.1		x	x	x	x	(x)
	D700	Special safeguards (AG)	AGR Art. 5.7 & 18.2 - MA:5		x	x	x	x	x
		Seasonal duties (if in tariff notification)	WT/L/225					x	x
E	E100	Import licensing (incl. automatic)	LIC Art. 1.4, 7.3, 8.2	x				x	(x)
	E200-E300	Quotas, prohibitions	QR - (G/L/59)	x				x	x
	E270	TRQ (AG, import fill)	AGR Art. 18.2 - MA:2	x				x	x
L	L000	Subsidies (excluding AG export subsidies)	SCM Art. 25.1 - Art. XVI:1	x					
N	N000	Intellectual property	TRIPS Art. 63.2 - Legislation	x					
O	O000	Rules of origin (non-preferential)	RO Art. 5	x					
		Rules of origin (preferential)	RO Art. 5 § 4 A. II	x					
P	P100	Export restrictions (AG)	AGR Art. 12.1(b) - ER		x	x	x	x	x
	P200	State trading (includes H110)	GATT 1994 Art. XVII:4(a)	x				x	x
	P700	Export subsidies (AG)	AGR Art. 10 & 18.2	x				x	x

Notes: For periodicity see Table A2.2. (x): Information sometimes provided. For specific dates – Initiation: the date when measure has been initiated (anti-dumping, countervailing duties) or put forward for comments (TBT, SPS); Start: the date when measure has been put in force; End: the date when measure has been withdrawn or terminated.

Source: Based on information provided in the WTO notifications.

3

NTMs: Interpreting the New Data

JULIEN GOURDON AND ALESSANDRO NICITA

3.1 INTRODUCTION

Since the paper 'Mystery of the Missing Trade' (Trefler, 1995), many studies have investigated the reasons why world trade is not as large as economic models predict. One of the most compelling explanations was provided by Obstfeld and Rogoff (2000) which suggested that large unobserved trade costs may explain most of the discrepancies between model estimates and trade statistics. The presence of hidden costs was supported by subsequent work, as in Anderson and Van Wincoop (2004), whose research indicated that the costs associated with cross-border trade even between well-integrated countries are well above those that can be explained by geographic distance and traditional trade policies. Although a number of studies have attempted to capture and quantify the impact of some of the hidden costs of trading (Maskus *et al*, 2005; Djankov *et al*, 2010; Hoekman and Nicita, 2011), these attempts are greatly constrained by the available data. The existing data on trade costs is largely related to tariffs, and only a few databases provide information on non-tariff measures and behind the border trade costs (eg the Doing Business database, the Trade Facilitation Database, the Logistic Performance Index, and the UNCTAD/TRAINS NTM database). Moreover, most of the existing data is too aggregated to be utilised for detailed policy analysis and often provides information only on the effects of trade impediments rather than on the impediments themselves. In practice, the analysis must compromise in terms of policy coverage focusing on the aggregate effects of the few countries or sectors where the data is available.

A particularly relevant issue for both researchers and policymakers is related to the impact of non-tariff measures (NTMs) on trade. There are several reasons to focus attention on NTMs as one of the main sources of trade costs. One reason is that their impact on trade is still poorly understood and not easily measured. NTMs encompass a wide set of policies that can have very diverse effects on trade. For example, requirements on marking, labelling and packaging, although adding to costs of production, generally are not discriminatory and have low compliance costs, and thus have relatively unimportant trade effects. On the other hand, quotas, voluntary export restraints and non-automatic import

authorisations often have much more significant effects. The second reason to examine NTMs is their proliferation. While NTMs have been around for years,[1] the use of NTMs to regulate trade has been rising since the 1990s both in terms of countries adopting these measures as well as in their variety. The third reason is that NTMs can be discriminatory. Even when NTMs are indiscriminately applied to all imported goods, many NTMs discriminate among a country's trading partners because costs of compliance are often different across exporters. Compliance costs are generally higher in low income countries, as NTM-related production processes and export services are often more expensive, or need to be outsourced abroad. Another reason to investigate NTMs is that they could be protectionist. Governments are using increasingly sophisticated methods about how they protect domestic industries. While trade barriers have historically taken more obvious forms, such as tariffs or quotas, trade barriers are now taking different forms which are harder to identify and quantify. A mounting concern is that liberalisation in tariffs may be countered by the increasing number of restrictive NTMs.

Broadly defined, NTMs include all policy-related trade costs incurred from production to final consumer, with the exclusion of tariffs. For practical purposes NTMs are categorised depending on their scope and/or design and are broadly distinguished in technical measures (sanitary and phytosanitary standards (SPS); and technical barriers to trade (TBT)) and non-technical measures. These are further distinguished in hard measures (*eg* price and quantity control measures), threat measures (*eg* antidumping and safeguards), and other measures such as trade-related finance and investment measures). In practice, NTMs are measures that have the potential to substantially distort international trade, whether their trade effects are protectionist or not. For example, measures such as quality standards, although generally imposed without protectionist intent, may be of particular concern to poor countries whose producers are often ill-equipped to comply with them.

The paucity of data on trade policy measures has been the main problem behind the study of the effect of NTMs on trade. Seemingly simple questions such as 'what are the policy measures countries impose' or 'what type of measures are faced by particular products' cannot be answered for most goods and countries because of the lack of detailed information. The fact that NTMs are increasingly used to regulate international trade makes the need to update data even more compelling.

The reason behind the scarcity of databases on NTMs is largely related to the difficulty in collecting the data and in assembling a consistent cross-country database. Unlike tariffs, NTM data are not merely numbers; the relevant information is often hidden in legal and regulatory documents. Moreover, these

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1   For example, English laws in the 17th and 18th centuries required that all colonial trade be conducted on British ships manned by British sailors. Also, certain goods had to be shipped to Great Britain first before they could be sent to their final destination.

documents are generally not centralised but often reside in different regulatory agencies. All these issues make the collection of NTM data a very resource intensive task. The first attempt to collect and categorise NTMs was conducted by UNCTAD in the late 1990s, and the data is available in the UNCTAD Trade Analysis and Information System database (TRAINS – accessible via WITS).[2] However, the TRAINS NTMs database has not been consistently updated in the last 10 years. To fill this gap and in response to the increased interest of both researchers and policymakers, UNCTAD and the World Bank in collaboration with the International Trade Centre and the African Development Bank, have initiated a new effort on NTM data with the objectives of improving the coverage and classification of NTMs and to update, consolidate and freely disseminate NTM data.

As early as 2011, this joint effort produced an updated NTMs classification as well as detailed new data for about 25 countries, with data from more countries in the pipeline. This paper makes use of the new data to provide some preliminary information on the incidence of NTMs across countries and by economic sector and by type of NTMs. Given limited coverage of the new data, the analysis is mainly descriptive in nature and employs simple indicators (an inventory approach based on frequency and coverage ratio) rather than trying to produce more complex measures such as price gaps or *ad valorem* equivalents. In practice, the analysis focuses on identifying the relative use of various types of NTMs, and their incidence across countries and products.

The rest of this study is organised as follows. The next section provides some details on the definition and classification of NTM data. The bulk of the descriptive analysis is in Section 3.3. There we provide descriptive statistics on the incidence of NTMs in terms of frequency (number of product lines exposed to NTMs) and coverage (share of total imports exposed to NTMs). In doing so, we analyse differences both in terms of countries and product groups. We also examine the evolution in the use of NTMs by using original data from the TRAINS database versus the data collected recently. Section 3.4 explores the relationship between NTM and traditional forms of trade policy. The last section summarises the main findings and offers some policy conclusions.

3.2   DEFINITION, CLASSIFICATION AND DATA COLLECTION

The definition of NTMs should encompass all measures altering the conditions of international trade including policies and regulations that restrict trade as well as those that facilitate it. NTMs are often incorrectly referred to as non-tariff barriers (NTBs). The difference is that NTMs comprise a wider set of measures than NTBs, which are now generally intended only as discriminatory non-tariff measures imposed by governments to favour domestic over foreign suppliers. The cause of this confusion is because in the past most NTMs were largely in the form of quota or voluntary export restraints. These measures are restrictive by

2   *http://wits.worldbank.org/wits.*

design which explains why the word 'barrier' was used. In present times, policy interventions take many more forms, and therefore it is preferable to refer to them as 'measures' rather than 'barriers' to underline that the measure may not be necessarily welfare or trade reducing.[3] For practical purpose, the commonly used definition of NTMs is:

> 'Non-tariff measures (NTMs) are policy measures, other than ordinary customs tariffs, that can potentially have an economic effect on international trade in goods, changing quantities traded, or prices or both.' (UNCTAD, 2010)

This definition is broad and to a large extent uninformative as it was in the case of NTBs, which were defined as policies that are not tariffs. To better identify NTMs, and distinguish among the various forms of NTMs, a detailed classification is therefore of critical importance. To facilitate data collection and analysis, the multitude of NTMs are often aggregated in various groups: hard measures (eg price and quantity control measures), threat measures (eg antidumping and safeguards), sanitary and phytosanitary standards (SPS), technical barriers to trade (TBT), and other categories such as 'export measures', 'trade-related investment measures', 'distribution restrictions', 'restrictions on post-sales services', 'subsidies', 'measures related to intellectual property rights' and 'rules of origin'. Each of these groups comprises various and often very different forms of NTMs. The classification (see Figure 3.1) proposed by UNCTAD and agreed by the Group of Eminent Persons on NTB[4] takes this into account and develops a tree/branch structure where measures are categorised into chapters depending on their scope and/or design. Then each chapter is further differentiated into several sub-groups to allow a finer classification of the regulations affecting trade. In practice, the NTM classification encompasses 16 chapters (A to P) and each individual chapter is divided into groupings with depth up to three levels (1, 2 and 3 digits). Although a few chapters reach the 3-digits level of disaggregation, most of them stop at 2 digits. The complete classification can be found in UNCTAD (2010).

The classification organises NTMs into various chapters, each comprising measures with similar purposes. All chapters reflect the requirements of the importing country on its imports, with the exception of measures imposed on exports (chapter P). The effect on trade of each group of measures varies considerably. While some groups of NTMs have clear restrictive impacts, others produce uncertain effects. For example, the subset of measures under categories (A) through (C) has a relatively clear relationship with the market imperfections they try to address (Beghin, 2006). These measures are largely regulatory

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3   For example, NTMs such as standards and regulations may expand trade by facilitating production and exchange of information, reducing transactions costs, guaranteeing quality, and achieving the provision of public goods (Maskus, Wilson and Otsuki 2005). Where trade in some products would have been difficult without clear standards, with it, trade could be created between two countries..

4   UNCTAD (2012).

policies in response to a variety of concerns raised by society in many areas such as the environment, animal welfare, food safety and consumers' rights. These policies are not necessarily restrictive because these types of instruments can also enhance consumer demand for goods by increasing quality attributes (technical requirements) or by reducing informational asymmetries (standards). However, many of these policies involve considerations of institutional capacity and likely have distortionary impacts on trade. Sometimes they are imposed to address the possible capacity failures of trade partners; and often they require an extensive domestic institutional capacity to implement these policies. Although different types of requirements affect different inputs and stages of production, most of these policies also affect overall trade costs (eg certification, inspections, etc). In addition, compliance costs often vary depending on infrastructure and institutional capacity of the exporting country, and thus ultimately these costs do affect trade flows.

Figure 3.1 *Non-tariff measure classification (1st tier – chapters)*
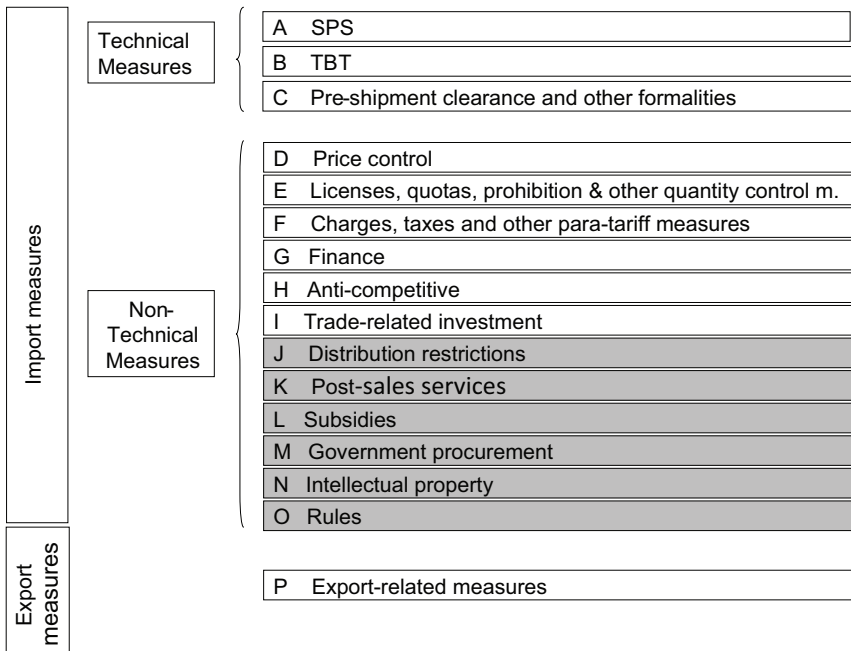
Non-technical measures vary considerably by intent and scope. However, their effect on trade is generally more understood and easier to quantify. The effects of price control measures are relatively simple to measure, especially anti-dumping and safeguards. Quantity control instruments have been extensively examined in the analysis of quotas, tariff rate quotas and their administration (see Boughner *et al*, 2000). Para-tariff measures can be analysed as conventional tax instruments and their incidence is straightforward to perceive. Finance, anti-competitive, and trade-related investment measures have indirect effects on trade, and their actual impact is more difficult to assess. Box 3.1 provides some more details on the measures contained in each chapter.

The classification discussed above greatly simplifies the data collection. However, being able to classify laws and regulations into the appropriate NTM category is only part of the challenge in assembling a database of NTMs. Besides a proper classification, one of the problems related to data collection is that, in most cases, there is not one sole national repository agency of NTM data as laws and regulations affecting trade are often promulgated by different government agencies and regulatory bodies. This makes the assembly of an exhaustive NTM database quite a challenging task. In practice, the data has to be carefully scrutinised for possible duplications, omissions, or any other problems in order to minimise inaccuracies.

This chapter provides an analysis based on the newly collected NTM data comprising 24 developing countries plus the European Union and Japan. The data covers measures from chapters A to I, and chapter P.[5] The data follows the HS classification at the 6-digit level covering more than 5,000 different products.

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5   Because of objective difficulties in the collection of data on some measures, data covering measures from chapters J to O was not actively collected.

Box 3.1 *Brief description of NTMs chapters*

Chapter A, on sanitary and phytosanitary measures, refers to measures affecting areas such as restriction for substances, restrictions for non eligible countries' hygienic requirements, or other measures for preventing dissemination of diseases, and others. Chapter A also includes all conformity assessment measures related to food safety, such as certification, testing and inspection, and quarantine.

Chapter B, on technical measures, refers to measures such as labelling, marking, packaging, restrictions to avoid contamination or other measures protecting the environment, standards on technical specifications, and quality requirements.

Chapter C classifies the measures related to customs formalities.

Chapter D, price control measures, includes measures that have the intention to change the prices of imports, such as minimum prices, reference prices, antidumping or countervailing duties.

Chapter E, licensing, quotas and other quantity control measures, groups the measures that have the intention to limit the quantity traded, such as quotas. Chapter E also covers licences and import prohibitions that are not SPS or TBT related.

Chapter F, on charges, taxes and other para-tariff measures, refers to taxes other than custom tariffs. Chapter F also groups additional charges such as stamp taxes, licence fees, statistical taxes, and also decreed customs valuation.

Chapter G, on finance measures, refers to measures restricting the payments of imports, for example when the access and cost of foreign exchange is regulated. It also includes measures imposing restrictions on the terms of payment.

Chapter H, on anticompetitive measures, refers mainly to monopolistic measures, such as state trading, sole importing agencies, or compulsory national insurance or transport.

Chapter I, on trade-related investment measures, groups the measures that restrict investment by requesting local content and thus restricting imports, or requesting that investment should be related to export in order to balance imports.

Chapter J, on distribution restrictions, refers to restrictive measures related to the internal distribution of imported products. These measures would hinder trade from taking place because there would be difficulty in distributing the products once entering the country.

Chapter K, on the restriction on post-sales services, refers to difficulties in allowing technical staff to enter the importing country to install or repair technological goods imported.

Chapter L contains measures that relate to the subsidies that affect trade.

Chapter M, on government procurement restriction measures, refers to the restrictions bidders may find when trying to sell their products to a foreign government.

Chapter N, on intellectual property measures, refers to the problems arising from intellectual property rights.

Chapter O, on rules of origin, groups the measures that restrict the origin of products so that they could benefit from reduced tariffs according to certain rules often set in multiple simultaneous agreements with different countries.

Chapter P, on export measures, groups the measures a country applies to its exports. It includes export taxes, export quotas or export prohibitions, etc.

3.3   THE INCIDENCE OF NTMS

There are various approaches for identifying the importance of trade measures and assessing their effects on international trade. Methodologies include simple inventory measures, computation of price gaps and the estimation of ad valorem equivalents. As the intent is mainly to explore the collected data, the paper utilises the simple inventory approach. This approach is based on two indices: the frequency index and the coverage ratio. The frequency index simply captures the percentage of products that are subject to one or more NTMs. The coverage ratio captures the percentage of imports that is subject to one or more NTMs.

The frequency index accounts only for the presence or absence of an NTM, and summarises the percentage of products to which one or more NTMs are applied. In more formal terms, the frequency index of NTMs imposed by country j is calculated as:

$$F_j = \left[\frac{\sum D_i M_i}{\sum M_i} \right] \cdot 100$$

where D is a dummy variable reflecting the presence of one or more NTMs and M indicates whether there are imports of good i (also a dummy variable). Note that frequency indices do not reflect the relative value of the affected products and thus cannot give any indication of the importance of the NTMs on overall imports.

A measure of the importance of NTMs on overall imports is given by the coverage ratio which measures the percentage of trade subject to NTMs for the importing country j. In formal terms the coverage ratio is given by:

$$C_j = \left[\frac{\sum D_i V_i}{\sum V_i} \right] \cdot 100$$

where the D is defined as before, and V is the value of imports in product i. One drawback of the coverage ratio, or any other weighted average, arises from the likely endogeneity of the weights (the fact that imports are dependent on NTMs). This problem is best corrected by using weights fixed at trade levels that would arise in a NTM (and tariff) free world. Otherwise, the coverage ratio would be systematically underestimated. While one cannot get to that benchmark, it is possible to soften the endogeneity problem (and testing for the robustness of the results) by using trade values of past periods.

We start the descriptive analysis by aggregating all the data collected and examining the incidence of various types of NTMs. Figure 3.2 illustrates the distribution of NTMs across five main chapters for the 26 countries collected so far. For each chapter both the frequency indices and coverage ratios are reported.

Figure 3.2   *Frequency index and coverage ratios by chapter (all countries, simple weighted)*
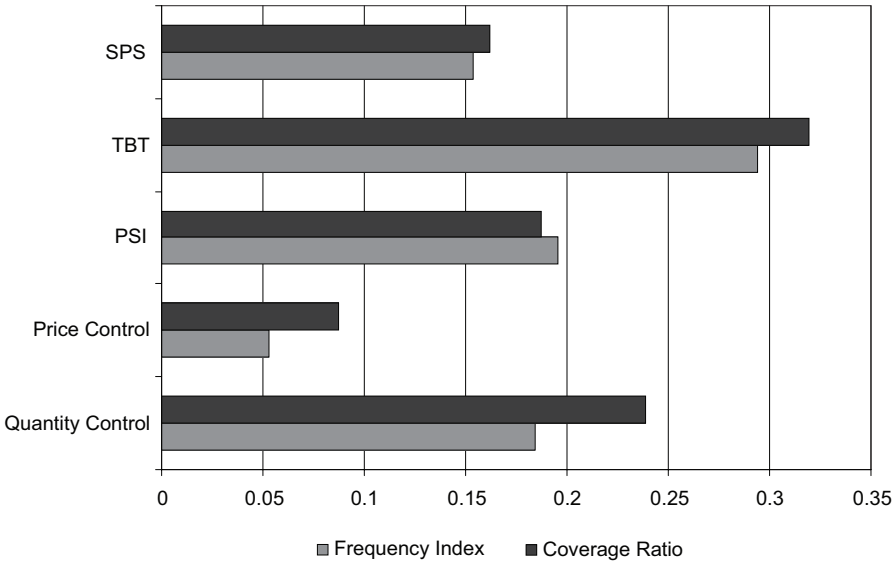
According to the newly collected data, TBTs are by far the most used regulatory measures with the average country imposing them on about 30% of products and trade. Countries impose SPSs on average on about 15% of trade. The large incidence of SPS and TBT raises concerns for developing countries' exports. These measures impose quality and safety standards which often exceed multilaterally accepted norms. Although these measures are not protectionist in nature they often result in diverting trade from developing countries where the production process and certification bodies are often inadequate. Moreover, the cost of compliance to SPS and TBT is often higher in low income countries as infrastructure and export services are often more expensive or need to be outsourced abroad. In practice, SPS and TBT may erode the competitive advantage that developing countries have in terms of labour costs and preferential access.

Among non-technical measures, pre-shipment inspections affect, on average, almost 20% of trade and products. Although pre-shipment inspections are often necessary to provide some assurance on the quality/quantity of the shipment, and thus may promote international trade, they add to the cost of trading. These additional costs may reduce the competitiveness of countries, thus distorting trade. Regarding price control measures (8% of trade and only 5% of products), these constitute one of the least used forms of NTMs. Price control measures affect only a small share of goods and are largely related to anti-dumping and countervailing duties, as well as some form of administrative pricing for staple food, energy and other sensitive sectors. Finally, the average country imposes quantity controls on about 18% of products and 23% of trade. Only a small

percentage of these measures still take the form of quotas and export restrictions, since most these quantitative restrictions are illegal under WTO rules. Some of them, such as quotas, prohibitions and export restraints are in place, but are largely limited to a number of sensitive products and in other cases they take the form of non-automatic licensing used as a tool to administer the importation of goods where SPS and TBT related issues are of particular importance. Some quantitative restrictions such as quotas, prohibitions and export restraints are in place, but are largely limited to a number of sensitive products.

The incidence of different forms of NTMs varies across geographic areas. Figure 3.3 illustrates the use of NTMs by differentiating the countries in the sample in three broad developing regions and a high income group. Although SPS and TBT are the most used forms of NTMs independently of the region, many countries especially in Asia and Latin America still implement a large number of quantitative restrictions (largely in the form of licensing). African countries appear to regulate their imports relatively more than many other developing countries, especially in relation to PSI. The reason behind this relatively large number of PSI is that these are often implemented to fight corruption, to facilitate and accelerate custom procedures, and ultimately to help in the correct evaluation of imports and their proper taxation. The large use of SPS and TBT by African countries may result from an effort to harmonise regulations with their main trading partner, the EU.

Figure 3.3 *Frequency index and coverage ratios by chapter (by region)*
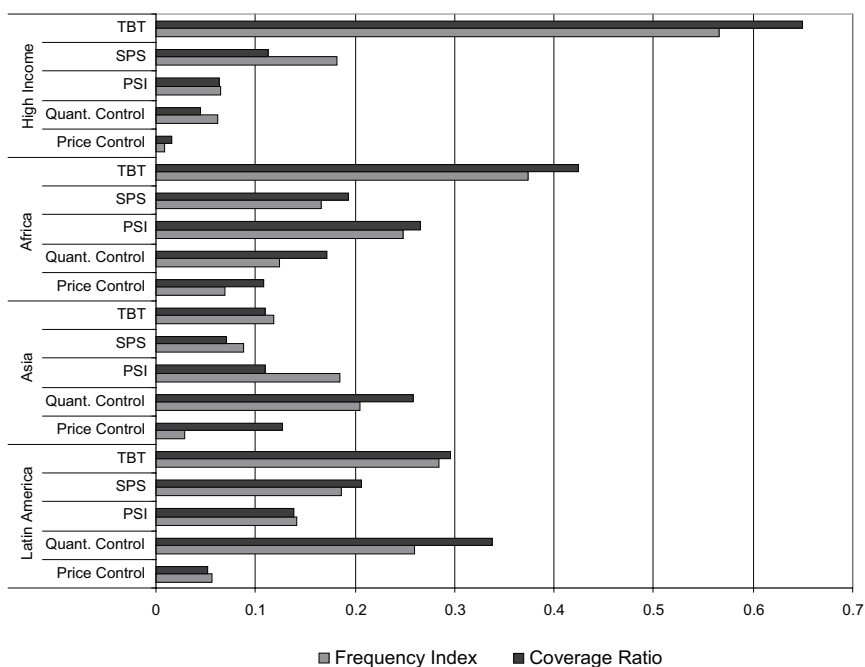
The use of NTMs varies considerably not only across regions but more so among countries. Figure 3.4 summarises the data in terms of frequency index and the coverage ratio for each country for all NTMs as a whole. On average, countries apply some form of NTMs for slightly less than half of the about 5,000 products included in the HS 6-digit classification. This figure greatly varies by country. For example, within Africa, Tanzania and Senegal use NTMs substantially less than Egypt, Kenya or Uganda. In Latin America, Argentina's use of NTMs is double that of Chile or Paraguay. In Asia, Bangladesh, Syria and the Philippines utilise NTMs much more than Cambodia or Indonesia. Although this large variance may be due to some extent to different primary data collection methods, this is likely to explain only part of the differences, as a large variance is also found for Latin American countries whose data is collected by the same agency: the *Associación Latinoamericana de Integración* (ALADI).

Figure 3.4 *Frequency indices and coverage ratios, by country*
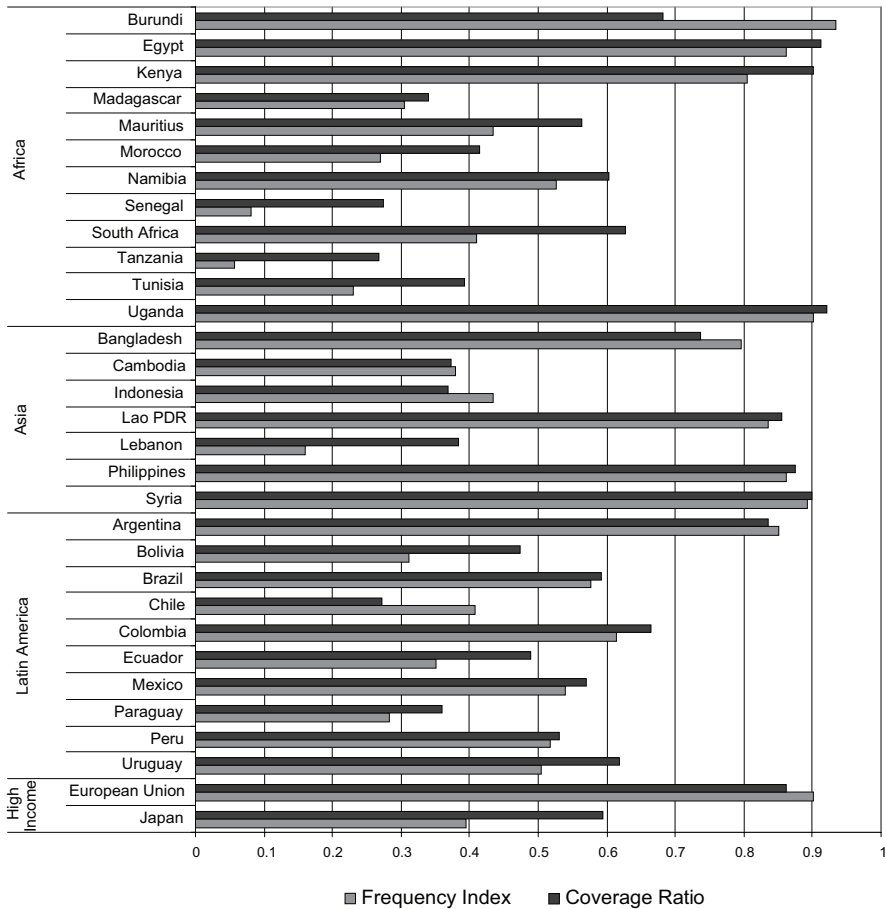
Similar conclusions can be reached by looking at coverage ratios (the percentage of imports subject to NTMs) as these are found to be highly correlated with frequency indices. Although correlated, coverage ratios are often lower than frequency indices. This is possibly due to the endogeneity issue described above (NTMs may restrict trade and this will downwardly bias the coverage ratio). The problem of endogeneity seems to be supported by the relatively lower coverage ratio for Latin American countries, where measures imposing quantity restrictions are still significant. The difference between the two incidence measures is particularly striking for Tanzania (from 5 to 30%) and Lebanon (from 15 to 40%). A coverage ratio relatively higher than the frequency index can be explained by two factors. The first is import composition. Countries, especially low income countries, often import larger volumes of products where NTMs are more extensively used (agriculture). The second factor is a larger use of NTM policies on products that are most traded (*eg* for consumer protection). This is often the case in developed countries.

   The incidence of the use of NTMs depends on both the percentage of products (or imports) affected by NTMs, and the number of NTMs affecting each product. Frequency and coverage ratios illustrated above do not take into account whether more than one type of NTM is applied to the same product. In practice, a large number of products have more than one regulatory measure applied to them. For example, a product could be subject to a sanitary standard as well as a technical measure on quality, and finally to some licensing. Arguably, the greater the number of NTMs applied to the same product, the more regulated the commerce of that product is, especially if measures are from different chapters. The rationale is that measures within the same chapter are similar in nature and thus often impose relatively less burden than measures from different chapters. To better illustrate the pervasiveness of NTMs, Figure 3.5 reports the number of products affected by one, two, three, or four types of NTMs, where types are differentiated by chapter.

   Although a large share of products affected by NTMs are subject to NTMs from only one chapter, a substantial number of products are affected from multiple different types of NTM. For example, among about 4,500 products where the EU imposes NTMs, about 3,200 are subject to NTMs from only one chapter, about 1,100 are affected by NTMs from two different chapters, and about 250 by NTMs from three or more chapters. Although the EU frequency index and coverage ratio are similar to that of Argentina, EU imports can be considered relatively less regulated, as the majority of Argentina's imports are affected by NTMs from two or more chapters. These statistics also allow us to verify the quality of the data. The case of Namibia (and possibly that of Kenya) is particularly striking as all 2,900 products where NTMs are applied are subjected to multiple NTMs from at least four different chapters. This is unlikely to be the case and the data from Namibia would need to be further scrutinised for possible errors in the classification procedure.

Figure 3.5 *Number of NTMs from different chapters affecting HS 6-digit products*
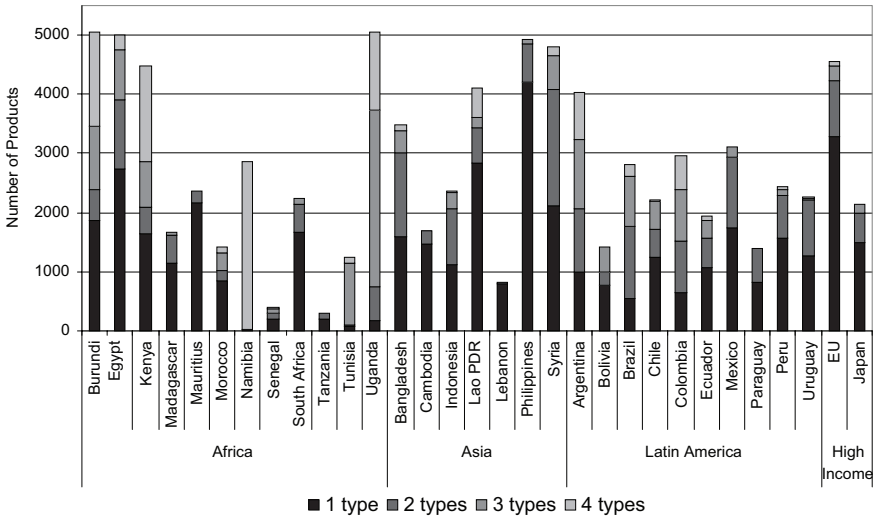
It is often the case that countries apply a wide number of NTMs within each chapter. For example, one specific good may be subject to geographical restriction, labelling, fumigation and some conformity assessments which all fall under the SPS chapter (A). Although some of these measures may impose few additional costs, some others are quite distinct. A large number of measures within a chapter could imply an even stricter regulatory framework. Thus, it is important to provide some information on the actual number of NTMs applied to single products. This information is given by simply calculating the average number of NTMs applied to each HS 6-digit product. Table 3.1 reports for each country the average number of NTMs applied to the products facing at least one NTM at the various levels of aggregation of NTMs classification.

Table 3.1   *Use of multiple types of NTMs at different level of aggregation*

Name	Number of lines with at least one NTM	Average over number of lines with NTMs		
		Chapter level	1-digit level	All types of NTMs
Argentina	4035	2.47	3.00	3.16
Bangladesh	3476	1.71	1.85	1.94
Bolivia	1408	1.75	1.91	1.99
Brazil	2808	2.25	3.07	3.15
Burundi	5040	2.47	5.34	7.17
Cambodia	1687	1.14	1.46	1.86
Chile	2224	1.68	1.83	1.87
Colombia	2962	2.46	2.99	3.12
Ecuador	1935	1.68	2.21	2.27
Egypt	5014	1.72	2.09	2.34
European Union	4550	1.36	3.80	5.18
Indonesia	2353	1.65	2.05	2.84
Japan	2132	1.37	4.88	8.39
Kenya	4491	2.55	5.74	9.02
Lao PDR	4100	1.63	2.58	3.68
Lebanon	829	1.04	1.29	1.46
Madagascar	1673	1.35	1.63	1.64
Mauritius	2354	1.08	1.08	1.45
Mexico	3105	1.49	1.59	1.64
Morocco	1417	1.77	3.11	4.13
Namibia	2857	4.14	9.02	9.41
Paraguay	1399	1.41	1.69	1.70
Peru	2427	1.43	1.71	1.93
Philippines	4934	1.17	1.22	1.27
Senegal	388	1.83	2.09	2.76
South Africa	2233	1.30	1.93	2.04
Syria	4803	1.75	2.07	2.40
Tanzania	288	1.33	1.73	1.83
Thailand	146	1.21	2.62	6.46
Tunisia	1244	2.95	6.00	11.38
Uganda	5062	3.08	3.12	4.09
Uruguay	2261	1.47	1.75	1.85
Average (simple)	2676	1.80	2.76	3.61

With very few exceptions, products are rarely affected by only one type of NTM because several regulatory measures are often applied in parallel. The average number of NTMs affecting products facing at least one NTM is 1.82 at the chapter level, 2.77 at the 1-digit level, and 3.61 when all possible NTMs are considered.[6] These figures vary considerably across countries. For example, while Mauritius imposes about one NTM measure at the 1-digit and chapter level for each of its 2,354 HS 6-digit products covered by NTMs, Japan imposes an average of almost five 1-digit categories of NTMs, mainly from the same chapter on its 2,131 HS 6-digit products subject to NTMs. This suggests that Japan, although imposing NTMs on a similar number of products than Mauritius, regulates its imports substantially more. Similarly, Tunisian import restrictions are applied on 1,244 products. These products face an average of 3 NTMs from different chapters and an average of 11 distinct types of NTMs. On the other hand, although Egypt applies at least one NTM for most of the HS 6-digit lines, only about an average of 2 NTMs are applied for each line. Although these statistics provide valuable information, such large differences at the most disaggregated level should not be considered proof of over-regulated import regimes. These differences could also be due to data availability and collection procedures. In particular, differences may be related to whether the document is detailed enough to distinguish among several types of similar NTMs, in which case NTMs are generally classified only under broader codes. Differences at the 1-digit level often reflect more real differences in the use of regulatory measures for imports, and thus can provide a better assessment of the regulatory regime. For example, both Mexico and Brazil impose some form of NTM for about 3,000 products. However, while Mexico applies only 1.5 1-digit NTM measure on each of these products, Brazil applies about 3 NTMs. Arguably, Brazil's imports can be considered on average more regulated than those of Mexico.

As NTMs regulate different aspects of the production and trade of goods, it is often the case that various types of NTMs are applied in parallel to the same product. While in most cases NTMs are used complementarily and applied simultaneously to the same product for technical or procedural reasons, there are other cases where NTMs are applied in parallel to further insulate domestic industries from foreign competition. To explore to what extent the various types of NTMs are complementary, we calculate correlation coefficients among 1-digit NTMs. Figure 3.6 shows correlation statistics where the size of dots depends on the magnitude of the correlation.

Figure 3.6 suggests several key patterns in the concurrent use of various types of NTMs. First, several SPS measures are often applied in parallel (for example, tolerance limits (A2) are often used in conjunction with labelling (A3) and hygienic requirements (A4) and also with treatment measures such as fumigation (A5) and conformity assessments (A8). Second, SPS measures are also often paired with TBT (B5). This is largely related to regulation on genetically modified organisms (GMO). SPS measures are also found to be

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6   These are averages only for products affected by at least one type of NTM.

correlated to direct consignment (C2), and to requirements to pass through specified custom ports (C3). This is possibly to facilitate the inspections and traceability of agricultural products. For similar reasons SPS measures are also correlated with non-automatic licensing (E1).

Technical barriers to trade (TBTs) are found to be relatively less correlated with other groups of NTMs. The only exceptions are the TBTs on production or post production requirement (B4) which are often used simultaneously with price controls (D4, D5 and D6) and quantity controls (E2 and E3). As there is no clear explanation why such NTMs should be correlated, it would be interesting to further explore this pattern. We leave this for future research. Finally, and not surprisingly, quantity and price controls measures appear closely interrelated. This specifically concerns quantity control: quota (E2) and prohibition (E3), and price control measure: anti-dumping (D4) and countervailing (D5) measures. All these measures are often used concomitantly to reinforce the protection of specific sectors.

Figure 3.6   *Correlation of different 1-digit NTMs*
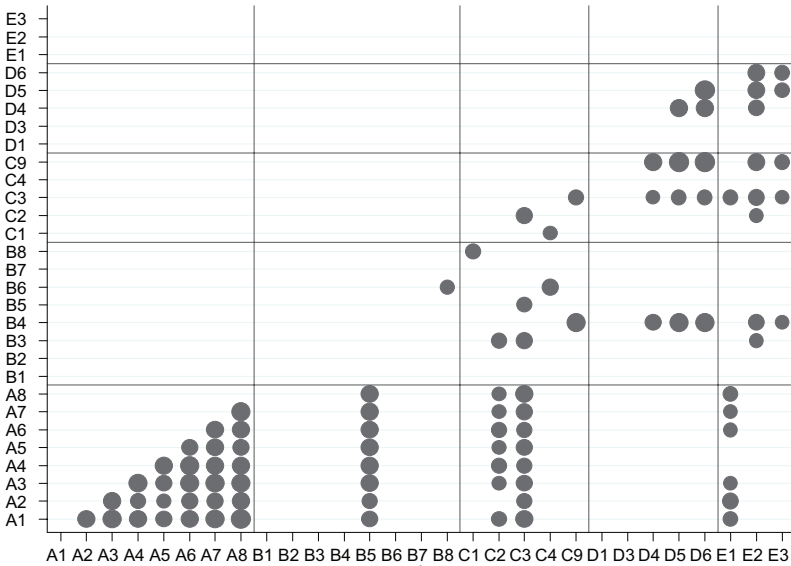
We now turn to analyse the impact of NTMs across economic sectors. The use of NTMs greatly varies across economic sectors both for technical and economic reasons. While some products, such as agriculture, electric machinery, weapons, are highly regulated because of consumers and environmental protection and technical standards, some other goods are by their nature less subject to laws and regulation. Table 3.2 reports frequencies indices of five broad categories of NTMs for 20 economic sectors.

Table 3.2   *Frequency indices across economic sectors*

	A: SPS	B: TBT	C: Pre-shipment	D: Price control	E: Quantity control
Live animals	71.3	36.2	21.3	5.7	33.4
Vegetable products	69.2	31.7	24.0	3.6	27.1
Fats and oil	51.1	26.8	12.9	8.0	20.7
Processed food	57.0	41.7	17.7	3.6	20.3
Minerals products	9.8	25.5	8.1	0.6	10.9
Chemical products	11.3	35.8	6.8	1.7	19.6
Rubber and plastics	1.2	24.1	5.7	0.8	6.3
Raw hide and skins	12.8	23.7	9.9	0.0	12.9
Wood	26.2	30.2	12.4	0.8	15.2
Paper	1.7	18.4	8.2	0.6	11.4
Textile	1.8	34.3	15.6	4.7	16.3
Footwear	0.7	38.8	16.7	3.3	17.9
Stone and cement	3.1	19.0	9.7	1.1	6.3
Base metals	1.6	21.0	9.6	1.2	12.2
Machinery & electrical equipment	1.1	20.8	8.2	0.8	13.1
Motor vehicles	0.3	26.2	8.4	0.7	22.5
Optical and medical instruments	0.4	20.0	7.9	0.2	8.1
Miscellaneous goods	1.6	23.0	7.2	4.1	7.2

The use of SPS measures is largely limited to agricultural sectors and products from animal origin, as their control is essential for ensuring the health and well being of consumers and the protection of the environment. As a result, more than 60% of food-related products are found to be affected by at least one form of SPS. On the contrary, TBT can suit a much wider set of products and indeed these are found to be more uniformly applied across economic sectors with peaks in textiles, footwear, processed food and chemicals. Measures involving pre-shipment requirement are widely distributed across economic sectors but concern a more limited number of products. Pre-shipment inspections are found to be more relevant for agricultural products, wooden products, textiles and footwear. Price control measures such as administrative pricing, anti-dumping and countervailing duties are trade defensive policies that by their nature are applied only to very specific products and thus result in low frequency indices. Like pre-shipment requirements, price control measures are more concentrated in agricultural products, textiles and footwear. Finally, quantity control measures are applied more or less uniformly across economic sectors with peaks on agricultural goods, animal products, motor vehicles and chemical products.

These are sectors where particularly sensitive products are often regulated by non-automatic licences, quotas, and sometimes outright prohibitions.

The distribution of NTMs across sectors, especially with regard to SPS and TBT, is due more to the technical properties of products than to economic policy, and therefore, does not vary substantially across countries. Other measures have a more heterogeneous distribution as the choice among different measures for the regulatory intent may be different across countries depending on various factors such as institutional capacity, implementation costs and effectiveness. Figure 3.7 illustrates regional averages of the frequency indices of five broad types of NTMs across six broad economic sectors. Although SPS are similarly applied to food products regardless of geographic region, Asian, Middle East and North African countries do not seem to apply as many TBTs for agriculture products, especially in comparison with Africa or Latin America. The finding of more TBT measures in the Africa region than in Latin America and Asia is surprising since one should expect fewer TBTs from lower income countries. One hypothesis is that these countries are implementing EU standards, so as to better compete in the EU market. Pre-shipment inspections are widely used in sub-Saharan Africa while they are limited to food products, textiles, apparel and footwear in other regions. Price control measures are limited to some food products across all geographic regions, and to textiles and apparel in Latin America. Finally, quantity control measures are found to have limited use in countries in the Middle East and North Africa. These measures are instead more widely used in Asian, sub-Saharan African and Latin American countries.

Countries are increasingly using NTMs to regulate their imports. Figure 3.8 illustrates the changes in the use of NTMs between 2000 and 2010. A caveat with this type of analysis is that there is little comparable NTM data across time, and most of it originates from Latin American countries. For all other countries the collection procedures have substantially changed and original data may not have been as complete as the data recently collected. Because of data limitation, Figure 3.8 reports the share of four broad groups of NTMs. With the exception of prohibitions, the number of products affected by NTMs has increased. In particular, the category where the number of products covered by NTMs has increased the most is SPS and TBT. As at 2010, about one-third of products in our sample of countries were affected by one or more types of SPS and/or TBT. Price control measures remained barely used while the use of quantity control measures declined, possibly because of the progressive tariffication of quotas. Finally, the use of other types of NTMs, such as pre-shipment inspection and contingency measures, appears to have substantially increased.

Figure 3.7 *Frequency indices across economic sectors, by region*

Latin America

Middle East and North Africa

Sub-Saharan Africa

East Asia
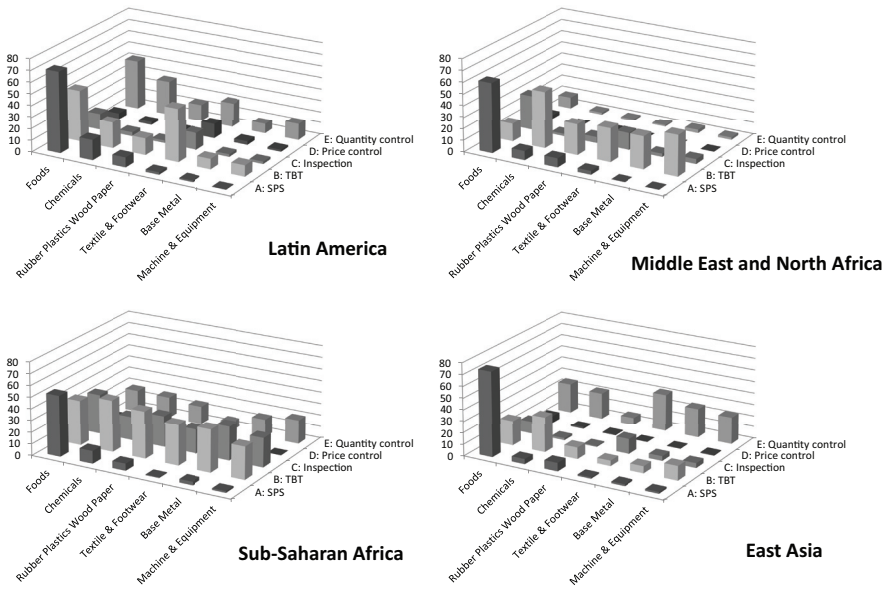
Figure 3.8 *Number of products covered by NTMs (2000 and 2010)*
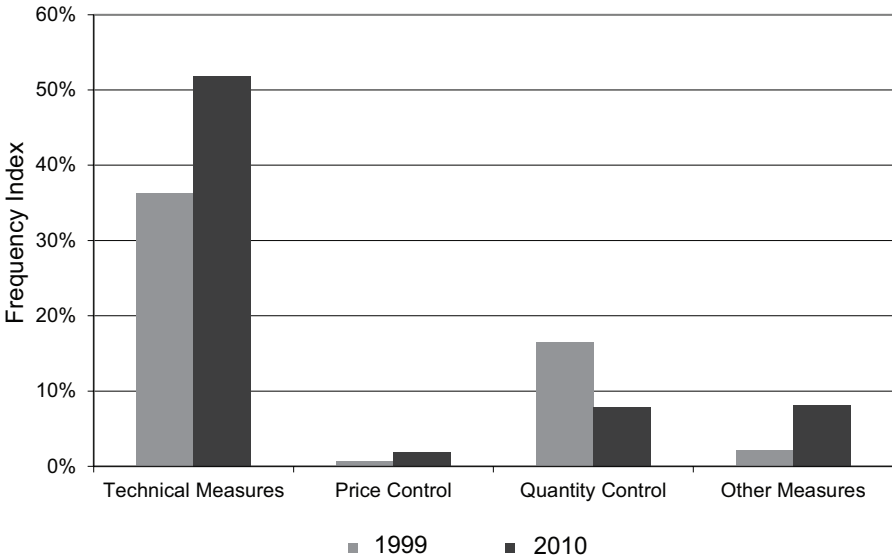
3.4   NTMS AND TRADITIONAL FORMS OF TRADE POLICY

The use of multiple instruments of trade policy to regulate imports involves not only NTMs but also traditional forms of trade policy. This section explores whether NTMs are used as the complements or substitutes of traditional trade policy, namely tariffs. The relationship between NTMs and tariffs can be assessed across countries or across products. In relation to countries, the analysis investigates whether countries applying restrictive traditional trade policies (high tariffs) are also those where NTMs are more frequently used so as to better protect their domestic industry from foreign competitors. If this is the case, it would result in a positive relationship between the use of NTMs and the level of tariffs as products may be protected not only by a large number of NTMs but also by high tariffs. Although a large number of NTMs may result from the nature of the product, when these are accompanied by a high tariff it may indicate the intent to use NTMs to complement tariffs to further insulate domestic industries from foreign competition.

The relationship between NTMs and tariffs across countries is illustrated in Figure 3.9 where NTMs are defined by their coverage ratio.

Figure 3.9   *Tariffs and NTMs coverage ratios*
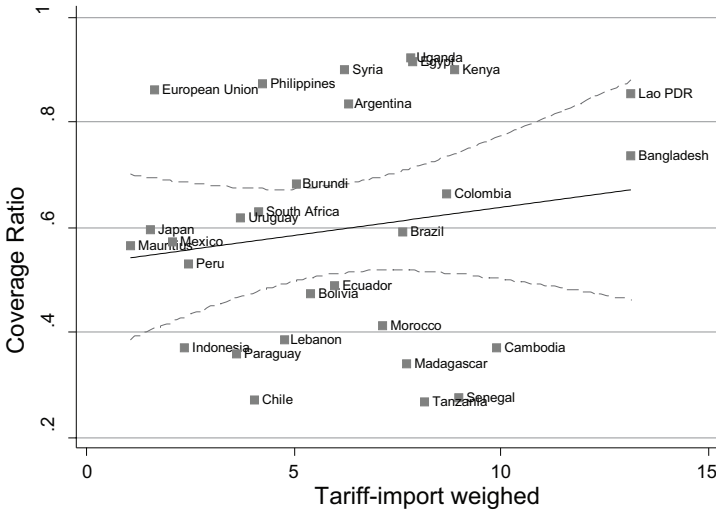
Although Figure 3.9 shows a high degree of dispersion, it also shows a clear positive correlation between tariffs and NTMs. The countries which apply more restrictive traditional trade policies are also those where imports are more affected by NTMs.

Similar conclusions are drawn by the correlation of tariffs and the number of products affected by NTMs. Figure 3.10 shows the correlation between the average number of NTMs at the chapter level and the tariff. The figure shows a stronger positive relationship indicating that countries where tariffs are higher also apply a larger number of NTMs per product.

Figure 3.10 *Correlation of NTM pervasiveness with MFN tariffs (simple and import weighted).*
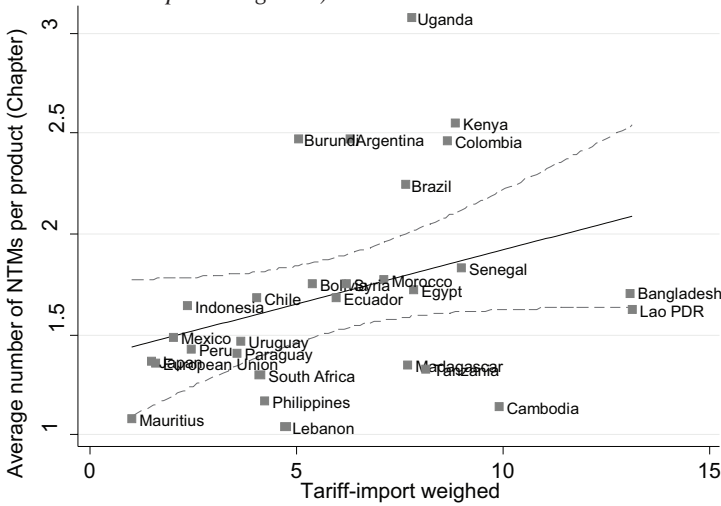
Taken together, these results indicate that protectionist tariff policy is often paired with more regulated NTMs regimes. To better explore whether NTMs are used in addition to tariffs to protect specific sectors, one needs to assess their relationship at the product level. Figure 3.11 illustrates the relationship between NTMs and tariffs across economic sectors.

Figure 3.11 *Correlation of NTM pervasiveness with MFN tariffs (simple and import weighted), by product*
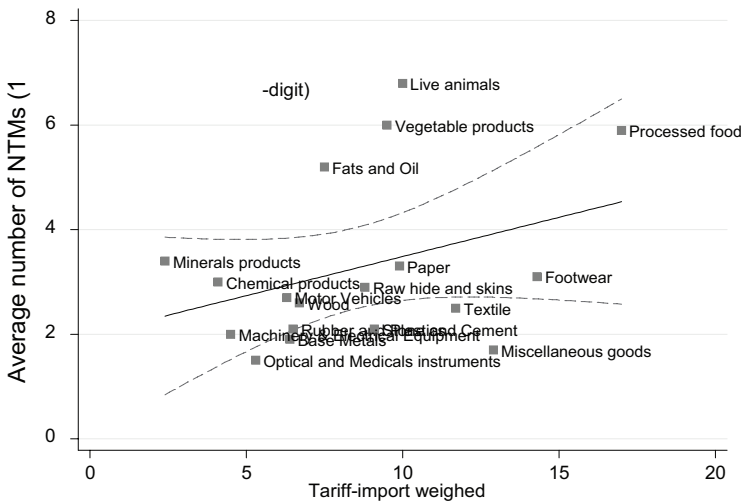
Also in this case the correlation is positive, suggesting that most regulated economic sectors are also those where tariffs are higher.

3.5 CONCLUSIONS

This study made use of data newly collected by UNCTAD and the World Bank to investigate the use of NTMs in about 26 countries. The analysis explored the incidence of various types of NTMs both across countries and economic sectors. The empirical approach consisted of simple inventory methods: frequency indices and coverage ratios.

Although our results have to be taken as mainly descriptive, preliminary and not to be generalised given the limited number of countries covered by the data, they reveal some important issues. The results find that the incidence of NTMs varies considerably across countries, across economic sectors and across types of NTMs. Across countries, overall inventory measures range from less than 10% to more than 90% of products or trade covered by NTMs.

Regarding the incidence of technical measures (SPSs and TBTs), these are found to be widely used. TBT are found to affect a large share (about 30%) of international trade. SPS are also frequently used, but they are exclusively related to agriculture and food products. Given the more limited scope for SPS, they affect only about 15% of trade but more than 60% of agricultural products. The large incidence of SPS and TBT raises concerns for developing countries' exports. Although these measures are not protectionist in intent they often result in diverting trade from developing countries where production processes and certification bodies are inadequate, or where the cost of compliance to these measures is higher. In practice, SPS and TBT may erode the competitive advantage that low-income developing countries have in terms of labour costs and preferential access.

The use of non-technical measures varies greatly across countries and economic sectors. Among these measures the use of quantity controls has increased but they are now largely limited to non-automatic licences while the use of quotas has declined since most of them were made illegal by WTO rules. As a whole, quantity control measures affect about 16% of products and 20% of trade. Pre-shipment inspection requirements affect about 11% of trade. These are implemented especially in low-income countries to help custom administrations in the correct evaluation of imports and their proper taxation. Price control measures are only rarely used and affect less than 5% of trade and only 2% of products. Finally, the results suggest the presence of correlation between the use of NTMs and traditional forms of trade policy. Countries that apply higher MFN tariffs are also those that have a larger number of products and a larger extent of imports affected by NTMs. This may indicate that NTMs have been used, at least to some degree, as substitutes to tariffs in order to continue protecting key economic sectors in spite of the tariff liberalisation of the last 10 years.

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4

AVEs in TRIST

OLIVIER CADOT AND OLIVIER JAMMES

4.1 INTRODUCTION

Partial-equilibrium (PE) simulation models have been used in many different contexts to provide orders of magnitudes for changes in trade flows and trade taxes as a result of policy changes. Compared to general-equilibrium models, PE ones ignore cross-market transmission mechanisms and feedbacks but permit much disaggregated analysis and thus reduce aggregation biases.

Up to now, PE simulation models have covered only tariff changes. This was very useful in the context of regional or bilateral negotiations like the Economic Partnership Agreements (EPAs) between the EU and ACPs . However, as substantial progress has been made in reducing tariffs, be they MFN or preferential, tariff reductions have lost some of their salience in negotiations. By contrast, the agenda of NTM streamlining, harmonisation and in some cases elimination is growing in importance. In some regional blocs like the East African Community (EAC) or the Common Market for Eastern and Southern Africa (COMESA), specific NTM-streamlining agendas are being put in place. At the same time, as consumers worldwide become increasingly intolerant of hazardous products, standards proliferate. Given that NTMs are product-specific instruments, using PE analysis to assess their effects on trade flows and border-tax revenue is a natural extension of existing models.

The information generated by the econometric estimation of *ad valorem* equivalents (AVEs) can be fed into PE models to make it possible to treat them like tariffs. However, subtle difficulties arise depending on the type of NTMs. Some of them, like licences or permits imposed to domestic importers, generate costs borne by consumers after the imported goods have cleared customs, in which case their CIF import value is not directly affected. By contrast, some others, like standards, may impose compliance costs to producers that may be passed on, in full or in part, into the CIF value of imports. In such cases the treatment must be different than for tariffs.

We use the TRIST model as a vehicle to illustrate some of the difficulties involved. In particular, we show with a numerical example that eliminating a standard may lead to reduced fiscal revenue from VAT and border taxes. However,

the effect on the tax base is less than the reduction in the compliance cost (the NTM's AVE) because direct effects and demand effects work at cross purposes. The direct effect of eliminating the compliance cost reduces the CIF value of imports and thus the tax base, but the price reduction raises import volumes and thus the tax base. If the elasticity of import demand is more than one, eliminating the standard will raise the tax base. At the other extreme, if it is close to zero, the tax base will shrink by close to the NTM's *ad valorem* equivalent.

4.2   UNDERSTANDING THE INCIDENCE OF NTMs

4.2.1   *Dissipative versus domestic-capture NTMs*

NTMs are heterogeneous in their type, effect and incidence. Beyond the descriptive categories spelled out in the 2009 MAST classification, the economist is interested in distinguishing them in terms of their incidence (on producers or distributors/consumers), their effects on production costs and competition, and their impact on measured trade flows.

To lay out the issues intuitively, consider first a tolerance limit on pesticide residuals in food that raises the marginal cost of production. Under mill pricing, producers will pass on the extra cost onto FOB prices. Under other pricing/ competition assumptions, they may not be able to do that and may absorb part of the cost, but let us assume that this is not the case. The FOB and CIF value of the importing country's imports will then go up through a direct effect, as if the NTM had a trade-enhancing value, although it is not the case, the upward effect on trade being a pure price one. This price increase, in turn, will trigger substitution and demand effects. Substitution between national varieties will not be affected if the NTM is imposed on an MFN basis, which is usually the case. However, there may be substitution between products (at a higher level of the consumer's budgeting decision), a demand effect that will work at cross purposes with the increase in trade value. Under mill pricing, the quantity demanded will go down along the demand curve as the consumer price goes up in the importing country, the CIF price (the one measured by trade statistics) remaining unchanged. Thus, the direct effect on import value will be a pure price effect whereas the indirect effect will be a pure quantity effect. The net effect depends on the elasticity of import demand. We will call this 'case 1'.

Consider now a licensing scheme for importers. The CIF price of imports may or may not be affected directly, depending on the licence-allocation mechanism and market structure. Suppose first that import licences go to the importing country's domestic agents who purchase at arm's-length from exporters. Under those circumstances, there is no direct effect on the CIF price of imports. However, there is an indirect demand effect as the price faced by consumers in the importing country includes the cost of licences. CIF import values will then unambiguously go down. We will call this 'case 2'.

Suppose now that licences go to exporters, who may have their own distribution networks in the importing country. The situation is then akin to a

VER , with quantities going down but prices going up. The price-raising effect is observationally equivalent to the direct effect we had in the case of a cost-raising NTM, although it is now due to increased market power rather than higher costs. The quantity-reducing effect is equivalent to our former indirect effect, although it is now the mechanical consequence of the restricted number of licences. Again, the effect on measured CIF import values depends on the elasticity of import demand. This case being equivalent to case 1, we will squarely ignore it.

Table 4.5 proposes a breakdown of NTMs by type, corresponding to the two polar cases identified above. A 'one' in the first column means the NTM falls in case 1, a 'one' in the second column means it falls in case 2 (meaning that we have assumed that licences went to importers). The overwhelming majority of case 1 NTMs are SPS or TBT measures (codes A and B respectively in the MAST nomenclature).

4.2.2 How effects vary by NTM type

Assume that imports of variety i (from country i) of a certain good into country d (for destination) are affected by an NTM imposed d on an MFN basis with *ad valorem* equivalent (AVE) a_j, a tariff with *ad valorem* rate τ_{id}, and a domestic tax with *ad valorem* rate τ_D. There is no transportation cost. For now, we assume that the AVE exists and can be estimated (more on this below).

With monopolistic competition and a constant marginal cost, producers charge a 'mill price', that is, the same price to all destinations, to which trade costs are applied multiplicatively. This generates a very simple relationship between consumer and producer prices, but the relationship is complicated here by the fact that NTMs can take one of the two broad types described earlier.

Let a type-1 NTM represent an SPS standard that raises the marginal cost of production in the exporting country (case 1), and a type-2 represent a licensing scheme that raises the cost of distribution in the importing country (case 2).

Case 1: Dissipative NTMs
Suppose that the producer of variety i can run two independent lines of production, one satisfying d's standard with production cost $p_i^* (1 + a_d)$, and one not satisfying it, with production cost p_i^*. Then p_i^* is the world price of variety i (when exported to destinations other than j) whereas $p_i^* (1 + a_d)$ is the CIF price (before tariffs and domestic taxes) of that same variety when shipped to d. The domestic price of variety i in country d will be

$$p_{id} = p_i^* \left(1 + a_d\right)\left(1 + \tau_{id}\right)\left(1 + \tau_d\right), \tag{1}$$

which is easily generalised to the case of multiple domestic taxes. Import values reported in COMTRADE will be

$$M_{i\ell} = \begin{cases} p_i^* \left(1 + a_\ell\right) q_{i\ell} & \text{when } \ell = d \\ p_i^* q_{i\ell} & \text{otherwise} \end{cases} \tag{2}$$

where q_{il} is the (unobserved) volume of imports. This means that the direct effect of the NTM's elimination will be to *reduce* the observed value of exports from i to d. However, of course demand effects will kick in and work at cross purposes. Note that, as product standards such as SPS are typically imposed on an MFN basis, there will be no substitution (trade-diversion) effects from their elimination; only trade creation (or trade destruction if the NTM is put in place rather than eliminated).

Case 2: Domestic-capture NTMs
In this case, the producer of variety i runs a single line of production and is not concerned (because of mill pricing) by the NTM, which affects the consumer price only. The domestic price of variety i in country d will now be

$$p_{id} = p_i^* \left(1 + \tau_{id} + a_d + \tau_d\right). \tag{3}$$

That is, the NTM's AVE enters additively with the tariff because now, unlike in case 1, the tariff is applied to the pre-NTM CIF price of the import. The NTM's AVE raises the imported good's price after the border has been crossed, when the distributer adds the cost of the licence cost to the good's internal price. Internal taxes are then applied to the price inclusive of both tariff and NTM AVE.

Unlike in case 1, the CIF value of imports is given by

$$M_{id} = p_i^* q_{id} \tag{4}$$

and the NTM's elimination will have no direct effect on observed trade values, although it will have an indirect effect through a change in domestic demand in country d following the change in consumer price. In that case the observed effect of the elimination of an NTM will be like that of the elimination of a tariff or domestic tax.

NTM combinations
The extension to several NTMs applied simultaneously to the same good is straightforward. With n dissipative NTMs and m domestic-capture ones, the domestic price becomes

$$p_{id} = p_i^* \left(1 + \sum_{k=1}^{n} a_{kd}\right)\left(1 + \tau_{id} + \sum_{k=1}^{m} a_{kd}\right)\left(1 + \tau_d\right) \tag{5}$$

That is, relative to the tariff, all dissipative NTMs enter multiplicatively whereas domestic-capture ones enter additively.

Suppose now that there are two NTMs, a dissipative one, a_1, and a domestic-capture one, a_2, and that the former is eliminated in importing country d. For simplicity of notation, let us drop the importing-country index d and introduce superscripts 0 and 1 for before and after the change respectively. Then

$$\frac{\Delta p_i}{p_i^0} = \frac{-a_1(1+\tau_i+a_2)(1+\tau)}{(1+a_1)(1+\tau_i+a_2)(1+\tau)}. \tag{6}$$

We will use this formula later on when discussing how to introduce changes in NTMs in the TRIST model.

4.3   ESTIMATING AVES

The econometric estimation of AVEs is described in detail elsewhere in this book. For our purposes here, let us only briefly recall the intuition of AVEs. Let Mid be the value of d's imports of that good (for which we use no index in order to avoid cluttering the notation) from i, as measured in COMTRADE statistics. Consider case 2, which is conceptually the simplest, and assume that there is only one NTM applied to the given good worldwide (the equations below can be easily expanded to the case of several NTMs); let

$$I_d = \begin{cases} 1 & \text{if NTM is applied} \\ 0 & \text{otherwise} \end{cases}$$

and τ_{id} be the ad valorem rate of a tariff applied by j on imports of the good from i. Let also ε_d be the elasticity of import demand (available from Kee *et al*, 2009). Assume that the import-demand function, after log-linearisation, takes the form

$$\ln M_{id} = \alpha_0 + \pmb{\alpha}_0 \mathbf{C}_i + \pmb{\alpha}_2 \mathbf{C}_d + \alpha_3 I_d + \varepsilon_d \ln(1 + \tau_{id}) + u_{id}$$

where $\mathbf{C}_i$ and $\mathbf{C}_d$ are vectors of exporter and importer characteristics respectively (comparative advantage and the like). Estimation issues will be discussed later on.

The NTM's AVE can be retrieved algebraically from estimated coefficients as follows. Exponentiating (7), evaluating it at $I = 1$ and at $I = 0$ respectively (ie with and without the NTM), and taking the ratio gives

$$\frac{M_{id}|_{I=1}}{M_{id}|_{I=0}} = e^{\alpha_3} \tag{8}$$

Similarly, exponentiating again (7), evaluating it with a tariff at rate a_d, with one at rate zero, and taking the ratio gives

$$\frac{M_{id}|_{\tau=a_j}}{M_{id}|_{\tau=0}} = e^{\varepsilon_d \ln(1+a_d)} \tag{9}$$

By construction, the NTM's AVE is the value of a_d for which (8) and (9) are equal. This gives

$$\alpha_3 = \varepsilon_d \ln(1 + a_d)$$

or

$$a_d = e^{\alpha_3 / \varepsilon_d} - 1. \tag{10}$$

In case 1, things are more complicated. With a direct effect of the NTM on trade flows, α_3 no longer gives a consistent estimate of the NTM's effect on log imports. To see this intuitively, observe that in order to estimate the effect of a trade barrier imposed at the border, one would want to correlate variations in import value with variations in the level or type, or simply presence of the barrier. With a flat export supply curve, the value of imports without the barrier is proportional to its volume, as in panel (a) of Figure 4.1, so the estimated relationship is the true one. However, with type-1 NTMs, the value of imports is inclusive of the compliance cost. Suppose now that the elasticity of import demand is close to one. Then whether or not the NTM is applied, and whether or not it reduces import volume, import *value* is constant, as in panel (b) of Figure 4.1. Correlating it with the NTM's dummy will return no effect (α_3 0), even if the NTM does reduce import volumes. In other words, the relationship in (7) should now be expressed in terms of latent, pre-compliance cost imports in order to preserve the proportionality between volumes and values.

Figure 4.1 *How NTMs affect import volumes, values and unit values*
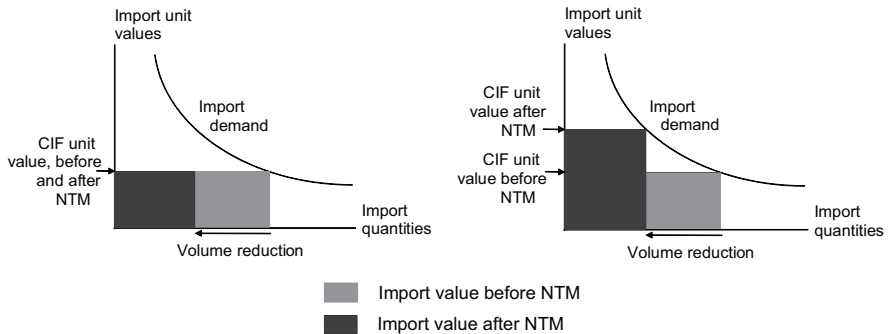
4.4   NTMs in TRIST

4.4.1   TRIST: The basic model

TRIST is a partial-equilibrium model of the effect of tariff changes on import values based on a three-stage budgeting process. At the broadest level, the consumer is assumed to set the amount consumed of each good depending on his income and their relative prices. Within each good's allocation, the consumer decides how much goes to the domestic variety versus imported ones. Finally,

within the allocation of foreign varieties, the consumer decides how much goes to each national variety depending on their relative prices. The solution method consists of working bottom up, first deciding on the share of each foreign variety depending only on their relative prices for a given amount spent on foreign varieties as a whole; then, deciding on the share of foreign versus domestic varieties depending on an index of the aggregate relative price of foreign varieties, for a given amount spent on that good; and finally setting the share of each good.

Let q_i^0 and p_i^0 be respectively the import quantity and price of variety i before the tariff change, q_i^1 and p_i^1 its quantity and price after the tariff change, and $\Delta p_i = p_i^1 - p_i^0$. Let σ be the elasticity of substitution between foreign varieties (chosen by the user) and μ the elasticity of substitution between the foreign varieties as a whole and the domestic one. Let also p_m be an import-weighted average of the price of foreign varieties and q_m the total imported quantity of the good (all varieties combined), so that $s_m = q_i/q_m$ is the share of variety i in total imports of the good and

$$\frac{\Delta p_m}{p_m^0} = \sum_j s_j^0 \frac{\Delta p_j}{p_j^0}.$$

Finally, q is the total consumption of the good (not indexed for simplicity) in all its varieties (imported and domestic). Using this notation, the lowest step (substitution between foreign varieties) is given by the following equation (see Brenton *et al*, 2009):

$$q_i^1 \Big|_{q_m, q \text{ constant}} = \frac{\sum_j q_j^0}{\sum_j \left(1 + \sigma \Delta p_j / p_j^0\right)} \left(1 + \sigma \frac{\Delta p_i}{p_i^0}\right) q_i^0 \tag{11}$$

$$= \alpha q_i^0.$$

The intermediate step (substitution between foreign varieties and the domestic one) is given by

$$q_m^1 = \left(1 + \mu \frac{\Delta p_m}{p_m^0}\right) q_m^0 \tag{12}$$

and the change in the overall share of imports in consumption of the good is allocated to each foreign variety in proportion to its initial share; that is

$$q_i^1 \Big|_{q \text{ constant}} = q_i^1 \Big|_{q_m, q \text{ constant}} + s_i^0 \Delta q_m \tag{13}$$

$$= \alpha q_i^0 + s_i^0 \Delta q_m.$$

Finally, let $s_m = q_m/q$ be the share of imports in consumption of the good, and

$$\Delta\bar{p} = s_m \Delta p_m$$

be the change in the aggregate price of imports weighted by the share of imports in consumption. In the uppermost step (overall consumption of the good),

$$q_m^1 = q_m^0 + s_m \Delta q$$

and the variation in qm due to that of the overall level of the good's consumption is, again, imputed to each imported variety in proportion to its initial share:

$$q_j^1 = q_i^1 \Big|_{q \text{ constant}} + s_m^0 \Delta q \tag{14}$$

$$= \alpha q_i^0 + s_i^0 \Delta q_m + s_m^0 \Delta q.$$

This gives the final demand effect of a change in the price of imported variety i on its import volume.

4.4.2 Integrating NTM AVEs

Basic issues
As we already noted, the introduction (or removal) of NTMs has both a direct and an indirect effect on import values. The direct effect is observed only in the case of dissipative NTMs which inflate the value of imports by the AVE of their compliance cost. It is inexistent in the case of domestic-capture NTMs, since they affect only domestic prices after import.

Formula (14) gives the variation in import volumes attributable to a change in the price of imports through demand (indirect) effects. Integrating the imposition or removal of NTMs in this formula implies no change in the model's structure, but a change in the construction of the exogenous import-price variation to accommodate not only tariffs and other border taxes, as in the baseline model, but also NTMs. This is done simply by using (6) for D p_i/p_i^0 in the equations above.

However, simulating changes in dissipative NTMs raises a specific problem, namely, how to treat their *direct* effect on import values. For instance, the elimination of a dissipative NTM reduces the value of imports by the amount of the compliance cost (the AVE), as per (6). How the direct effect should be treated in the simulation depends on its objective. If the objective is to assess the fiscal effect of NTM elimination, then the reduction in the value of imports inclusive of compliance costs is relevant, since this value is the tax base for tariffs and other border taxes. If the objective is to assess the effect of NTM elimination on import volumes, then the direct effect should be 'filtered out' of the simulation. This can be done by defining as baseline imports their (unobserved) value before compliance costs. That is, start from the case in (6) with one dissipative NTM (with AVE a_1) and possibly a domestic-capture one, assume that the dissipative

one is eliminated, and let $M_i = p_i q_i$. Baseline import value should then be the observed value deflated by the AVE a_1:

$$M_i^0 = \tilde{M}_i \big|_{I=1} = \frac{p_i^0}{1 + a_1} q_i^0$$

The extended model is written so as to easily accommodate this alternative way of measuring initial imports.

Incomplete pass-through

Suppose now that there is incomplete pass-through of the AVE of NTMs. In the case of dissipative NTMs, observed trade values will be inflated by less than the full compliance cost. In the case of domestic-capture NTMs, they are never inflated so nothing changes. We now define a pass-through parameter 'bridging' the cases of dissipative versus domestic-capture NTMs. Suppose that a fraction λ of an NTM's compliance cost is borne by foreign producers and passed on to the CIF price of imports, whereas a fraction $1 - \lambda$ is borne by domestic importers in the destination country, and hence does not affect border prices. Alternatively, one can think of the fraction $1 - \lambda$ of the compliance cost as being absorbed by the producers. Combining (1) and (3) with weights λ and $1 - \lambda$ respectively gives

$$p_{id} = p_i^* \left[1 + a_d + \tau_{id} \left(1 + \lambda a_d \right) \right] \left(1 + \tau_d \right) \tag{15}$$

4.4.3 An illustrative calculation

In order to get a feel for how the introduction of NTM AVEs affects fiscal-revenue simulations in TRIST, consider the following illustrative calculation in which a country eliminates a 'case-1' NTM, say a standard, imposed on all import sources of a given product. Let the home country import $500 from each of two exporting-country groups, labelled 1 and 2, and $1,000 from the rest of the world. Assume that the elasticity of substitution between national varieties is –1.5 and the price elasticity of import demand at the product level is –1, both in algebraic values of course.

The raw data from the importing country is shown in Table 4.1, where STR stands for import tariff, CTR for for a para-tariff charge, and excise and VAT are self-explanatory.

Table 4.1 *Illustrative case – the raw tariff data in importing country*

	Imports CIF	NTM AVE	NTM incidence	STR	CTR	Excise	VAT
ROW	1000.0	0.20	1		170.0	0.0	232.0
Country Group 1	500.0	0.20	1		85.0	0.0	117.0
Country Group 2	500.0	0.20	1		70.0	0.0	112.0
Totals	*2000.0*				*325.0*	*0.0*	*461.0*

From the data in Table 4.1, several transformations can be done, shown in Table 4.2. The first column 'deflates' the CIF value of imports by the AVE of the NTM, which is assumed estimated outside of the model (and is therefore part of the raw data in Table 4.1). This gives lower values that we call 'IF', that is, including insurance and freight but excluding the cost of complying with the standard. Second, *ad valorem* rates can be calculated for all taxes by dividing receipts by CIF import values using Table 4.1's data. Finally, total fiscal revenue, shown in the last column, can be calculated equivalently by summing the tax receipts in Table 4.1 or by applying the *ad valorem* rates calculated in Table 4.2 to CIF import values.

Table 4.2   *Ad valorem rates and pre-reform fiscal revenue*

	Imports CIF	Imports IF	STR	CTR	Excise	VAT	Total fiscal revenue
ROW	1000.0	833.3	0.17	0.00		0.198	402.0
Country Group 1	500.0	416.7	0.17	0.00		0.200	202.0
Country Group 2	500.0	416.7	0.14	0.00		0.196	182.0
	2000.00	1666.7					786.0

The simulation consists of eliminating the standard. This will involve no substitution effects between national varieties since the standard was applied on an MFN basis. However, it will reduce the CIF price of imports since it embodied the compliance cost. The reduction in the price (and total value) of imports will have two effects: (i) it will raise import volumes; (ii) it will reduce fiscal revenue, since taxes are levied on the CIF value of imports. Demand effects are shown in Table 4.3.

Table 4.3   *Illustrative case: demand effect of eliminating a standard*

	p/p*		Price decrease	Demand variation
	pre	post		
ROW	1.682	1.402	-0.167	0.167
Country Group 1	1.685	1.404	-0.167	0.167
Country Group 2	1.637	1.364	-0.167	0.167

The ratio of domestic (post-taxes) to foreign prices goes down from the values in the first column to those in the second, with an equivalent price decrease due, in all three cases, to the elimination of the 20% compliance cost (the proportional decrease is smaller for more heavily taxed varieties since the standard's AVE accounts for a smaller part of the total price wedge). As a result, prices decrease by 16.7% in all three cases, so with a unit demand elasticity, volumes go up by just 16.7%.

   Fiscal revenue, by contrast, goes down as taxes are levied on the CIF value of imports, which goes down by the amount of the eliminated AVE. This is shown in Table 4.4.

Table 4.4 *Illustrative case: fiscal revenue effect of eliminating a standard*

	Imports IF = CIf IF	NTM AVE	NTM incidence	STR	CTR	EXCISE	VAT	Total fiscal revenue	% variation in fiscal revenue
ROW	972.2	-	0	165.28	0.00	225.56	390.8	-0.0278
Country Group 1	486.1	-	0	82.64	0.00	113.75	196.4	-0.0278
Country Group 2	486.1	-	0	68.06	0.00	108.89	176.9	-0.0278
	1944.4						*448.19*	*764.2*	*-0.0278*

The decrease in tax revenue is –2.78%. The direct effect of eliminating the standard's compliance cost, which reduces the tax base, is largely offset by the demand effect shown in Table 4.3 which raises import volumes (and values). On net, the negative effect on tax revenue is only a fraction of the direct effect, but this is of course a result of the elasticity assumptions. With a demand elasticity of 0.5, the tax-revenue loss jumps to –9.72%. As the price elasticity of demand goes to zero, only the direct effect remains and the tax-revenue loss tends to the negative of the NTM's AVE.

In the (rare) case of non-MFN NTMs, substitution effects would magnify revenue losses, since importers would turn to the partner exempted of the cost-raising NTM, thus shifting the tax base from high-price sources to low-price ones.

4.5 CONCLUSION

The current version of the TRIST model makes it possible to assess, *ex ante*, the effect of reforms in border taxes on trade flows and fiscal revenue in a partial-equilibrium but highly disaggregated framework. The partial-equilibrium aspect eliminates all cross-market interactions and feedbacks but is the price to pay for the disaggregation, which eliminates aggregation bias.

Including in the model the AVEs of NTMs is a natural extension, provided that one uses it carefully. As discussed in the introduction, NTMs are complex measures which serve many purposes, and focusing exclusively on their trade effects would be at best partial and at worse misleading, if it led to policy prescriptions for elimination disregarding the protection of local public goods.

With all the necessary caveats, the NTM-augmented version of TRIST proposed in this chapter, which has already been developed and is available for use, makes it possible to assess the effects – sometimes surprising – of the elimination of non-tariff border measures. For instance, if elimination reduces the import price of goods, the tariff base goes down, which reduces tariff revenue for a given volume of imports through a direct effect and raises it through an indirect effect whereby import demand goes up. TRIST's flexibility makes it possible to examine these effects product by product at a highly disaggregated level, providing a flexible and simple tool for governments to assess precisely the effects to be expected from the elimination of reform of single measures.

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PART II

Standards and Technical Regulations: Trade Barriers or Facilitators?

5

Reputation Matters: Spillover Effects in the Enforcement of US SPS Measures

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5.1 INTRODUCTION

Non-tariff measures have become progressively more important as trade policy instruments as applied tariff rates have fallen across the world in recent years. From a development perspective, technical regulations and product standards are a particularly important type of non-tariff measure because they highlight the fact that the favourable market access accorded under duty and quota-free preferential schemes remains conditional on compliance with regulations in areas such as consumer safety. Previous research shows that product standards and technical regulations in the large, developed markets can have two contradictory sets of effects for developing country exporters. On the one hand, the costs of compliance – retooling, product redesign, testing and certification – can be substantial enough to keep many small and medium enterprises out of international markets, thereby affecting the pattern of international specialisation (eg Essaji, 2008). But at the same time, foreign standards can also provide the impetus for firms and sectors to upgrade production technologies and realise beneficial productivity gains (eg Maertens and Swinnen, 2009). The question of which types of standards tend to promote which set of effects is clearly of vital policy importance to developing country exporters. The issue of how best to direct technical assistance resources so as to support the upgrading of standards systems and development of compliance mechanisms in developing countries is also an important part of broader Aid for Trade discussions.

Most previous work on standards and technical regulations has focused on the rules themselves, rather than their application or enforcement through specific at-the-border mechanisms. There are a number of recent exceptions, however. Karov *et al* (2009) focus on identifying the trade impacts of US SPS regulations at the product-country level by analysing the effects of treatment requirements and grants of new market access. Similarly, Alberini *et al* (2005) examine

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implementation of the FDA's seafood HACCP programme using a dataset of plant inspections. Neither paper, however, deals with the import refusals mechanism that is the focus of the present paper. Buzby *et al* (2008) and Buzby and Roberts (2010) analyse similar data on US import refusals to that used in the present paper, but only provide descriptive statistics. Baylis *et al* (2010) use data on EU import refusals in a gravity model to show that they tend to decrease trade. However, they do not examine the determinants of import refusals, and in particular the potential for reputation effects, which is the focus of our paper. Finally, the first stage of the empirical approach taken by Cadot *et al* (2010) uses EU import alerts – closely related to refusals – as the dependent variable, but the cross-sectional setting of their regressions means that they are unable to account for reputation effects of the type we are interested in here.

In this paper, we use newly collected data to focus on one important example of the *de facto* implementation of product standards: refusal of entry into the US market for imported foods. The advantage of looking at measures such as import refusals is that they are implemented on a country- and product-specific basis, rather than being the same *de jure* for all exporters. Most standards and regulations are effectively most-favoured nation (MFN) measures, which makes it difficult to identify their effects on exporters by exploiting cross-country variation in outcome measures, such as trade flows. Focusing on a country- and product-specific measure, such as import refusals, provides a potentially much richer source of data in which identification can be based on cross-country as well as cross-product and through-time variation.

In addition to exploiting new data on US import refusals, this paper makes a number of contributions to the existing literature. First, we provide some of the first explicit evidence of reputation effects in the enforcement of SPS measures. Specifically, we show that even after controlling for the size of import flows, a history of SPS compliance is associated with fewer current import refusals. Second, we show that it is not just reputation for a particular product that matters, but sector-wide reputation (ie, there are cross-product spillovers in SPS enforcement): a product tends to suffer from more import refusals if closely related products are also subject to refusals. Third, we investigate, and find evidence to support, the hypothesis that the reputation of neighbouring countries also matters for SPS enforcement. Our results suggest that imports are more likely to be refused if the same product from neighbouring countries has also been subject to refusals. We interpret this finding as evidence in favour of geographical spillovers in SPS enforcement.

To our knowledge, the three reputation effects we are investigating have not been explicitly considered before in the literature. Baylis *et al* (2010) use similar data to ours to analyse the determinants of US import refusals over the period 1998–2004. Their core hypotheses are that: countries with greater experience exporting food to the US experience fewer refusals (the 'learning curve' effect); and import refusals are subject to political pressure (the 'standards for sale' effect; see Grossman and Helpman, 1984 for the case of tariffs). The data indeed support the second hypothesis: standard political economy measures

such as the level of lobbying activity, decreases in US employment, and anti-dumping actions are significantly associated with a higher number of refusals. However, the authors find that the data do not support their first hypothesis: more recent exporters actually face fewer refusals than established ones, even after controlling for export volumes. They speculate that this result may be due to a direct reputation effect, namely that enforcement resources tend to be concentrated on past violators. They do not pursue the point, but it is one that we take up here, using a different empirical specification that can better identify the effect, which we find to be highly significant. This paper therefore develops the intuition in Baylis *et al* (2010) in relation to individual reputation effects, but also extends it to include the possibility of reputational spillovers from related products and sectors.

The paper proceeds as follows. In the next section, we provide an outline of the US import refusals regime. Based on that description, Section 5.3 presents our dataset, focusing on the new import refusals data. We present some preliminary analysis that supports our hypotheses using descriptive statistical techniques, then proceed to develop a fully specified econometric model of import refusals. Section 5.4 presents and discusses the results from our model, and conducts robustness checks. Section 5.5 concludes with a discussion of policy implications, and avenues for further research.

5.2 THE US IMPORT REFUSALS REGIME

Imports of food into the US have significantly increased in volume, variety and also diversity of origin. Food and agricultural imports doubled from $41 billion in 1998 to $78 billion in 2007 (Buzby and Roberts, 2010). Fruit and vegetable and fish product imports have followed the same trend: fruit and vegetable imports increased more than five-fold from $811.5 million in 1989 to $4.28 billion in 2007, a 10.5% rate of annual growth (Karov *et al*, 2009). The value of imports of edible fish products (including canned fish) increased 2.5 times from $5.4 billion in 1988 to $13.7 billion in 2007. Between 2007 and 2010, imports augmented further to reach $14.9 billion.[2]

Imports as a share of US consumption have been rising rapidly too. Imported fruits and nuts represented 33.9% of total US consumption in 2004, up from 13.4% during the 1981–5 period. For vegetables, imports increased from 4.5% to 10.9% of US consumption over the same period (Buzby *et al*, 2008). Similarly, while less than 50% of US fish consumption was imported products in 1980, the market share of imported products was over 75% in 2003 (Allshouse *et al*, 2003).

According to Buzby and Roberts (2010), since 1990, there have been 77 new entrants in the market for fresh and minimally processed fruits, and 40 new entrants for fresh and minimally processed vegetables. This means for American

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2 Source: Fisheries Statistics Division of the National Marine Fisheries Service (NMFS).

consumers a higher variety of products (eg, exotic fruits), and availability all year round.

This rapid increase, which outstrips the overall growth of consumption in the US, and most likely efficiency improvements from foreign suppliers, demonstrates that improvements in market access have certainly played a crucial role.

Market access conditions for fruit and vegetables and fish, however, noticeably differ.[3] Seafood trade imports into the US are generally less restricted than other food products; there are no quotas and heavy duties on imports. Ninety per cent of imports of fish enter duty free compared to 24% for fruits and vegetables; the average tariff on fish products is 1.0% against 4.9% for fruits and vegetables (WTO , 2010). Moreover, imports of fruits and vegetables have been historically highly restricted, with strict regulation of entry eligibility for foreign products, and for 22 categories of fruits and vegetables the presence of 31 marketing order regulations specifying how products should be marketed.[4]

5.2.1   Eligibility to export to the US: Plant health controls and Memorandum of Understanding for molluscan shellfish

The US Department of Agriculture's Animal Plant Health and Inspection Service (APHIS) is the agency charged with regulating entry eligibility into the US under the authority of the Plant Protection Act. The purpose is to 'safeguard U.S. agriculture and natural resources from the risks associated with the entry, establishment, or spread of animal and plant pests and noxious weeds' (source: APHIS website[5]).

At the outset, only a share of the world's production is eligible for export to the US. For instance, Mexican avocados were banned until 1997. The importation of fresh apples is permitted from only 17 countries, representing 44% of global exports of apples, and 15% of global production (USDA ERS , 2010). For products like fresh olives, dates and figs, none or almost no imports are allowed.[6]

When access to the US market is permitted, this is often under the condition of complying with a number of pest-mitigating measures, such as treatments (eg fumigation), the implementation of risk management systems, geographic origin or destination restrictions, and pre-clearance requirements (Karov *et al*, 2009). Standards vary for each country and are recorded in the APHIS Fresh Fruit and Vegetables Import Requirements (FAVIR),[7] a positive list of fruits and vegetables that have been approved for entry into the US and the requirements that must be met for admission into the US. By definition, all other products are banned, although not being on the list does not necessarily mean an outright

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3   Which is one of the motivations for focusing on both sectors in our analysis.
4   See *http://www.ams.usda.gov/AMSv1.0/FVMarketingOrderLandingPage*.
5   See *http://www.aphis.usda.gov/*.
6   *http://www.ers.usda.gov/Data/FruitVegPhyto/data.htm*
7   Per 7 CFR 319.56 as well as the quarantine 56 streamline revision APHIS published July 2007.

import ban: it may just reflect the fact that no exporter applied for an importation permit.[8] A summary of FAVIR can be accessed through an online database.[9]

The control of fish product imports generally focuses on product testing and inspection. However, raw molluscan shellfish may only be imported into the United States from countries whose seafood regulatory authority has an appropriate Memorandum of Understanding with the FDA (Australia, Canada, Iceland, Japan, Mexico, New Zealand and the United Kingdom).[10]

5.2.2 Food safety

Food products are the source of numerous food-borne illnesses (due to pathogens, toxins and chemicals). All food products must be unadulterated (not bear or contain any poisonous or deleterious substances), be fit for consumption, and not contaminated or decaying, in order to be allowed for consumption in the US. At the federal level, there are three agencies involved in the oversight of food and food ingredients safety: the US Department of Agriculture's Food Safety and Inspection Service (FSIS), the Food and Drug Administration (FDA), and the Environmental Protection Agency (EPA). FSIS ensures the safety of imported meats, poultry and processed egg products. FDA covers all other products.[11] EPA licenses pesticide products and monitors pesticide residues in products. The FDA enforces compliance with the limits set by FDA by testing US-produced and imported food. To sum up, FDA supervises pesticide residues, food hygiene, additives and contamination.

The FDA enforces the 1938 Federal Food, Drug and Cosmetics Act (FD&C) as well as other laws designed to protect consumer health, welfare, and safety. Under s. 801 of the FD&C, products are subject to inspection when imported. Imported food products are expected to meet the same standards as domestic products – that is, they must be pure, wholesome, safe to eat and produced under sanitary conditions. Food imports must also contain informative and truthful labelling in English.[12]

Standards mean for fruits and vegetables that FAVIR requirements have to be met. Another important requirement is that since 1997, producers must follow FDA's good agricultural practices (GAP) for the control and management of microbial food safety.

Likewise, since 1995 fish products imports must meet hazard analysis and critical control point (HACCP) standards, as must domestic producers. HACCP standards are also included in the Codex Alimentarius international standard. Implementation of the standard varies internationally: in the case of the US, HACCP applies to processors only, in contrast with the EU where it applies to

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8   Applying for a permit is a complex process.
9   *http://www.aphis.usda.gov/favir/info.shtml*
10   *http://www.fda.gov/InternationalPrograms/Agreements/MemorandaofUnderstanding/default.htm*
11   This includes not only the other food products, but drugs, biologics, cosmetics, medical devices, and electronic products that emit radiation.
12   *http://www.fda.gov/ForIndustry/ImportProgram/ImportProgramOverview/default.htm*

the entire supply chain. Other measures applying to seafood include traceability requirements such as the identity preservation system for molluscans, and labelling of origin and method of production (wild harvest or farm raised).

Other programmes concerning food products in general are also in place such as the acidified and low acid canned foods regulations. Acidified and Low Acid Canned Foods must be manufactured in accordance with FDA regulations. Food canning establishments must also register with the FDA.

All the measures described above are defined on the principle of national treatment: importers and domestic producers are subject to the exact same requirements. There is, however, a significant difference of treatment between domestic goods and imported products, in implementation of food safety measures. The Act allows for refusal of imported FDA-regulated products for 'appearing' to be adulterated or misbranded. The law is interpreted in a broad sense as allowing the FDA to make admissibility decisions based not only on physical evidence such as examination, facility inspection or laboratory results, but also based on historical data, information from other sources (eg about a disease outbreak), labelling, and any other evidence.[13] Factors such as reputation can clearly come into play in this decision. In other words, if there is the faintest suspicion that a product from a given origin will not meet FDA standards, it can be detained. Therefore the standard of proof for determination of refusal for food import products is much less strict than for domestic products, which must be based on an actual violation. Therefore we can form the hypothesis that refusals may be partly path-dependent (as noted by Baylis *et al*, 2010) since past histories of violation from similar products and origins are criteria that may be used to decide whether there is a suspicion of adulteration of misbranding, which can in turn justify a refusal.

Baylis *et al* (2010) explain that this looser requirement may be motivated by the fact that the FDA has less easy access to means of verification for imported products: for instance FDA does not have extra-territorial jurisdiction and may not be able to inspect foreign plants. This is also ultimately motivated, according to the FDA, by limited resources for physical inspection of products.[14]

5.2.3 *FDA process for importing products*

Under the Public Health Security and Bioterrorism Preparedness and Response Act 2002, the FDA issued regulations in December 2003 requiring two things: (1) that food facilities (including foreign) are registered with the FDA;[15] and (2) the FDA be given advance notice of shipments of imported food. Depending on the mode of transport, notices must be submitted between 2 and 8 hours and 5 days prior to arrival. The information required for prior notice (PN) varies, based

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13 Presentation by Domenic Veneziano, Director, FDA Division of Import Operations at the Food & Agriculture Border Gateway Summit, 16 January 2008.

14 ibid footnote 10.

15 Registration is for the purpose of collecting information and is not an approval process.

on the type of entry, mode of transportation for entry, and whether the food is in its natural state.[16]

The prior notice is filed with customs and the FDA. Upon reviewing the notice, the FDA can decide to release the product, request additional information or documents, request physical examination of the product, or recommend detention of the product. Detention means that in the absence of petition or reconditioning of the goods from the exporter, the product will not be released into US territory and will either be re-exported or destroyed within approximately 90 days.

Physical examination entails verification of labelling, of the container integrity, sampling and verification, and leads to either a recommendation of release or detention. According to the literature, about 1–2% of all food shipments are subject to physical examination by the FDA, and a fraction of these are subject to sampling (Buzby *et al*, 2008; Baylis *et al*, 2010).

5.2.4   Alerts

The FDA relies on a system of alerts for particularly sensitive categories of products in order to help it save and allocate inspection resources. Alerts are issued when the FDA determines that there is a particular risk associated with a product, producer/exporter, country or region of origin.

As mentioned earlier, the FD&C treats imported and domestic products differently. Imported products that appear to be in violation of import requirements can be refused admission without examination, so-called detentions without physical examination (DWPE). In most circumstances, alerts determine that firms and products identified will be subject to DWPE. In this case, the FDA will automatically detain the concerned products until it is demonstrated to the FDA that the violation has been remedied. Therefore the burden of proof falls on the shoulders of the importer or shipper, or the manufacturer/grower of the product. As noted by Baylis *et al* (2010) alerts are strikingly rarely changed: three quarters of alerts in place in 2009 had been in place for more than 10 years, and a significant portion of them (one quarter of all alerts) for more than 20 years.

Alerts appear to be decided on a similar legal basis to refusals, for example the standard of 'appearance'. According to the FDA, alerts are triggered by historical violations at the following levels: commodities; manufacturers/shippers; growers; sometimes importers; geographic area; and countries of origin (Veneziano, 2008). Sources of information come from FDA's own field offices, but also foreign inspections and evidence from other countries.[17] It is not entirely

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16 See (21 CFR 1.281) for details on the required information. The PN requires additional information to what is normally required under the import process: the country from which the article is shipped and the crossing location within the port of arrival; revised information is also required regarding the actual manufacturer, the registration number of the manufacturer and shipper and information about the grower if known. *http://www.fda.gov/Food/FoodDefense/Bioterrorism/ucm083245.htm*

17   For instance, beyond publicly available evidence such as refusal data, the EU and US authorities communicate on certain matters.

clear how criteria leading to an alert differ from those to determine detention without physical examination, but it is likely that they are closely related. For instance, previous import refusals are a factor used to justify the creation of an alert.

Since alerts are used to allocate inspection resources and also decide automatic detention, and that alerts are themselves decided on the basis of past history of violation, we can assume that this acts as reinforcing the potential for path-dependence in the refusal of foods entering the US.

5.3 METHODOLOGY AND DATA

As the above discussion demonstrates, US border authorities exercise broad discretions when implementing the import refusals regime. As previously noted by Baylis *et al* (2010), there is a strong possibility of path dependence: the authorities might look at past patterns of compliance in allocating scarce enforcement resources, leading to a correlation between past and present import refusals, even after controlling for other factors. We refer to this as the 'own reputation' effect. In addition, the structure of the US import refusals system is suggestive of two other effects that might be in operation. One is a 'sector reputation' effect, by which we mean the possibility that import refusals for a particular product are associated with past import refusals affecting closely related products. The second is a 'neighbour reputation' effect, namely the possibility that import refusals affecting a given product from one country might be more likely if neighbouring exporters of the same product have a history of non-compliance. In the remainder of this section, we outline the data and model we will use to test for the existence of all three effects.

5.3.1 US import refusals data

This paper uses a new dataset of US import refusals for the period 1998–2008. It extends the data used in Jouanjean (2011), and covers HS chapters 3 (fish and crustaceans), 7 (vegetables), 8 (fruits), and 20 (preparations of vegetables, fruits and nuts). Refusals in these sectors accounted for over 50% of all FDA import violations over the 1998–2004 period (Buzby *et al*, 2008). We are therefore confident that by focusing on these three sectors, we are capturing an important part of overall import refusal activity in the US. This subsection describes the US import refusals regime in more detail, focusing on the way in which the data used here were collected.

Since 1998, the FDA has implemented an automatic system governing the admission process for FDA-regulated shipments of foreign-origin products presented for entry into the US. The system, known as the 'Operational and Administrative System for Import Support' or OASIS, is designed to simplify operations and reduce the time taken for clearance of shipments. It classifies imported items into different risk categories by tracking historical data on shipments that were previously refused admission into the US. Again, this

process is suggestive of path dependence and reputation effects of the type that are the focus of this paper.

The FDA makes refusals information public in their Import Refusal Report (IRR), which is generated from OASIS data. Reports provide information on the manufacturer's name and country of origin, as well as the dates and motives for the refusal. To gain access to historical refusals data, we submitted a Freedom of Information Act request in September 2009, which the FDA satisfied by supplying data in May 2010.

Products in the OASIS system are identified by a specific FDA code. In order to relate these products to reported trade flows, we constructed a correspondence mapping FDA codes to the Harmonized System at the 4-digit level. FDA product codes comprise five elements: Industry Code, Class, Subclass, Process Indicator Code (PIC), and Product Code. The Industry Code describes the broadest area in which a given product falls. In this paper, we focus on refusals related to Industry Codes 16 (fishery and seafood products), 20–22 (fruit and fruit products), and 24–25 (vegetables and vegetable products), see Appendix)

The Class Code defines a narrower category of products that are specific to each industry. In other words, one Class Code can have a different definition under various Industry Codes. Class Codes provide two pieces of information. First, they give more information on the 'sub-group' to which a product belongs. In addition, they help clarify the kind of transformation the product has been subject to.

For convenience, we refer to the class sub-group as 'Industry Type' and to the type of transformation as 'Class Name'. In the event that a Class is only assigned to a sub-group of the Industry Code but that no specific transformation is mentioned (such as Class A in the following examples), we apply a specific mention 'Not Further Specified' (NFS).

The last two codes, Subclass and Process Indicator Codes (PIC), are specific to each food industry code. The former gives an indication as to the material type of the container holding the product (metal, glass, etc), and the latter describes the process used in preparing the product (raw, commercially sterile, pasteurised, etc). The association of both the Industry and Class Codes to the Product Code is usually enough to define the product in the HS classification.

Assumptions made in constructing the database
Exporters provide the product code relating to their shipment when they file the prior notification required by the FDA for any food exports to the US. Exporters build this code themselves according to FDA recommendations. However, it can sometimes happen that exporters or importers have a different understanding of how they should build product codes, and might sometimes lack the relevant information. This kind of issue is highly unlikely for most of our products of interest, since they are generally fresh or minimally processed. However, one specific code definition from the FDA retained our attention and necessitated more careful handling as we describe in the following.

For all Classes except NFS, the association of the Industry Code, Class, PIC and Product is precise enough to avoid any misunderstanding by exporters. It therefore enables an obvious correspondence with the Harmonized System code at the HS4 level. However, the association of the specific PIC defining 'Packaged Food' with NFS Class can be more problematic. Indeed, exporters tend to use this code for many types of products for which another appropriate PIC or Class should probably be preferred. Thus, the correspondence with the HS4 classification requires the use of the Subclass code to differentiate products comprised under this association of PIC defining 'Packaged Food' and NFS designations.

For 'Metal' and 'Glass' containers, we make the straightforward assumption that those products were transformed, and thus fall into HS Chapter 16 for fish and fishery products, and HS Chapter 20 for fruit and fruit products, and vegetables and vegetable products. For containers of different materials, we use two sources of information. First, data from 1998 to 2001 contain product description data in which the FDA agent could fill in a precise definition of the product. Second, we extend the research using the name of the manufacturer from the database in order to gather information from company websites on the type of products they are exporting. According to this sample of manufacturers, we were able to make assumptions about the type of transformation associated with those product codes.

5.3.2   Other data

In addition to the novel dataset on FDA import refusals discussed in the previous subsection, we use standard data sources for the remaining variables used in our analysis (Table 5.1). We source trade data from UN-Comtrade, accessed via the World Bank's WITS platform. We use US import data for 1998–2008 at the HS4 level, including all exporting countries. In light of the high quality of US import data, we replace all missing values with zero to indicate that no trade took place for the given exporter-product-year combination. We only include trade data for which we have corresponding refusals data, namely HS chapters 3, 7, 8 and 20. In addition to trade data to control for imports in levels and first differences, we source per capita GDP data in PPP terms from the World Development Indicators. Finally, as an additional robustness check (see below), we estimate the model including US effectively applied import tariffs as an additional explanatory variable. These data are sourced from UNCTAD's TRAINS database via the World Bank's WITS platform.

Table 5.1 *Data used in the analysis of US import refusals*

Variable	Description	Year	Source
$GDPPC_{it}$	Per capita GDP of country i in year t (in PPP terms)	1998–2008	World Development Indicators
$Imports_{ikt}$	Imports of product k from country i in year t, in quantity terms (not value)	1998–2008	UN Comtrade via WITS
$Refusals_{ikt}$	Number of import refusals affecting product k exported from country i in year t	1998–2008	Authors
$Tariff_{ikt}$	Effectively applied US tariff on product k from country i in year t	1998–2008	UNCTAD TRAINS via WITS

5.3.3 Preliminary analysis

Before moving to a fully specified econometric model, it is useful to examine some simple correlations in the data to see whether they support our three hypotheses, namely the own reputation effect, the sector reputation effect, and the neighbour reputation effect. As outlined above, we expect to see positive associations between, on the one hand, the number of refusals for a given country-product-year combination and, on the other, the number of refusals affecting that country-product combination in the previous year (own reputation), the number of refusals affecting related products – those in the same HS2 chapter – from the same country in the previous year (sector reputation), and the number of refusals affecting the same product from related countries – the five geographically closest to the exporter – in the previous year (neighbour reputation). For ease of presentation we consider data for a single year only, 2008 (the most recent year in our database), and convert the variables to logarithms to reduce dispersion.

In all three cases (Figures 5.1–5.3), the data provide support for our propositions. The positive association is strongest, as would be expected, in the case of own reputation (Figure 5.1). Although the correlations in Figures 5.2 and 5.3, which capture reputational spillover effects, are weaker, they are nonetheless positive and 1% statistically significant. In terms of slope coefficients, the stronger gradient of the line of best fit in Figure 5.3 than in Figure 5.2 provides some preliminary evidence that neighbour reputation may be quantitatively more important than sector reputation.

Of course, the graphical analysis we have presented is based on simple correlations only. It does not take account of intervening influences. To address this issue more fully, the next subsection develops an econometric model, for which we report estimation results in the next section.

Figure 5.1 *Current versus lagged refusals, 2008*
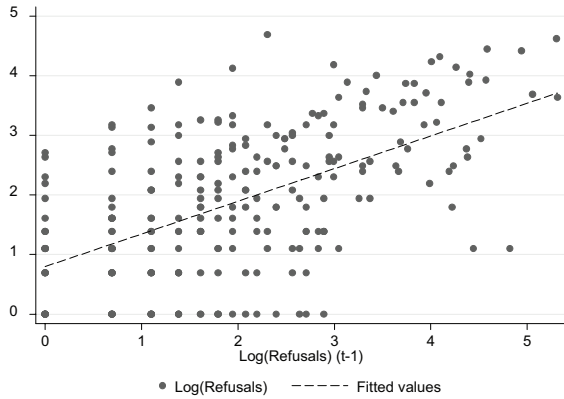
Figure 5.2 *Refusals versus lagged refusals affecting similar products (same HS2 chapter), 2008*
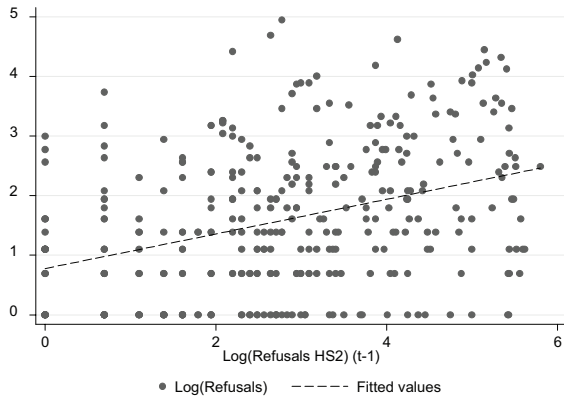
Figure 5.3 *Refusals versus lagged refusals affecting the five closest countries, 2008*
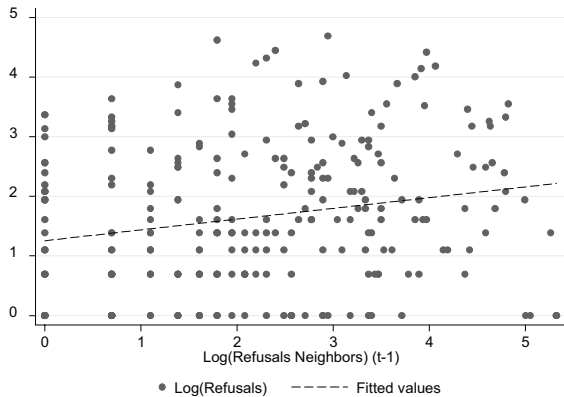
5.3.4 Empirical model

As discussed above, we are primarily interested in assessing the impact of reputation effects in the enforcement of US SPS regulations through import refusals. Our dependent variable is therefore a count of the number of import refusals affecting a particular exporter-product-year combination. Because it takes strictly non-negative integer values, we use the Negative Binomial model as our workhorse estimator.[18] However, in additional results available on request, we show that the choice of estimator is not critical to our main conclusions. In particular, our results stand if a Poisson estimator is used instead. However, we prefer the Negative Binomial model due to obvious over-dispersion in the dependent variable, that is, its variance (27) is substantially greater than its mean (0.5).

As independent variables, we include three measures of reputation. The first, 'own reputation', is simply the lagged dependent variable, that is, the number of refusals affecting a given exporter-product combination in the previous year. The second, 'sector reputation', is a lagged count of the number of refusals affecting products in the same HS 2-digit chapter from a given exporter, but excluding the number of refusals affecting the product in question. It is therefore a measure of the extent to which related products are subject to import refusals. The third variable, 'neighbour reputation', is a lagged count of the number of refusals affecting the same product exported from geographically close countries. We define 'closeness', using geodesic distance as the benchmark, that is, the five closest countries to the exporter. If reputation effects are present in the data, we expect all three of these variables to have positive and statistically significant coefficients.

It is also important to ensure that we control for other possible influences on the number of import refusals. The level of imports, and the speed of import growth, are two obvious controls to include. We expect both to be positively associated with the number of refusals. For a given probability of refusal, a higher volume of imports leads mechanically to a greater number of refusals. We expect import growth to be positively associated with refusals because an import 'surge' is likely to lead to a concentration of enforcement resources on the new exporter, for which there is little history of compliance. In both cases, we use import volumes (quantities) rather than values, to ensure that we are capturing pure quantity effects, and not mixing quantity and unit value effects, which would be the case if we used import values. Moreover, we keep both variables in levels, rather than taking logarithms, to ensure that observations with zero trade are retained in the estimation sample.

In addition to import quantities in levels and first differences, we also control for the exporting country's per capita GDP. We use this measure as a proxy for

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18 Because of numerical problems with Stata's built-in Negative Binomial estimator, we estimate the model using the more general GLM framework and iterative re-weighted least squares. See Santos Silva and Tenreyro (2011) for full details of this issue as it affects the closely related Poisson estimator.

the exporter's level of financial and technical capacity, which is an important determinant of its ability to comply with foreign standards. To take account of additional country-, product-, and time-specific factors, we also include a full set of fixed effects in those three dimensions. Product-fixed effects are of particular importance, because they allow us to control for the inherent riskiness of particular products, which is likely to lead to a greater rate of inspections and refusals.

Bringing these points together, and specifying the mean of the count of refusals conditional on a matrix of explanatory variables , gives an empirical model of the following form:

$$E[Refusals_{ikt}|\mathbf{X_{ikt}}] =$$

$$b_0 + \underbrace{b_1 Refusals_{ikt-1}}_{\text{Own reputation}} + \underbrace{b_2 \Sigma_{j=1;\,j\neq k}^{K_{HS2}} Refusals_{ijt-1}}_{\text{Sector reputation}} + \underbrace{b_3 \Sigma_{j=1;\,j\neq i}^{N_{Neighbours}} Refusals_{jkt-1}}_{\text{Neighbour reputation}} + \quad (1)$$

$$b_4 \Delta Imports_{ikt-1} + b_5 Imports_{ikt-1} + b_6 \log(GDPPC_{it}) + f_i + f_k + f_t$$

where f indicates fixed effects in the exporter (i), product (k), and time (t) dimensions.

5.4 ESTIMATION RESULTS AND INTERPRETATION

Table 5.2 column 1 presents results for the baseline model, that is, Equation (1) above. In line with expectations, the lag of import quantity has a positive and 1% statistically significant coefficient; however, lagged import growth has an unexpected negative and statistically significant coefficient.[19] This finding suggests that import volumes are obviously an important determinant of the total number of refusals, but that it is the overall quantity of imports – not recent growth – that matters most. Indeed, recent growth may be capturing improvements in country competitiveness, including upgrading of the standards system, which would tend to make refusals less likely. Finally, per capita GDP has a negative coefficient, which is in line with expectations, but it is statistically insignificant. Rather than interpret this result as indicating that the level of development of national standards infrastructure is not relevant to the determination of import refusals, we instead conclude that per capita GDP is simply a poor proxy for the variable we are really interested in measuring. In any case, we return to the issue of income effects below, when we split the sample into different World Bank income group categories.

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19 In additional results, available on request, we show that our findings are not sensitive to the specification of the past import growth term. For instance, using growth over the five preceding years does not make any qualitative difference to our results.

Table 5.2   *Regression results*

	(1) Baseline	(2) Tariffs	(3) UMI+LMI+LI	(4) LMI+LI
$Refusals_{ikt-1}$ Own reputation	0.062*** (0.000)	0.047*** (0.000)	0.053*** (0.000)	0.057*** (0.000)
$\sum_{j=1;\,j\neq k}^{K_{HS2}} Refusals_{ijt-1}$ Sector reputation	0.004*** (0.000)	0.003*** (0.000)	0.006*** (0.000)	0.005*** (0.002)
$\sum_{j=1;\,j\neq i}^{5} Refusals_{jkt-1}$ 5 Neighbour reputation	0.011*** (0.000)	0.007*** (0.000)	0.013*** (0.000)	0.013*** (0.000)
$\Delta Imports_{ikt-1}$	–0.000** (0.044)	–0.000 (0.622)	–0.000*** (0.000)	–0.000 (0.100)
$Imports_{ikt-1}$	0.000*** (0.000)	0.000*** (0.002)	0.000*** (0.000)	0.000* (0.073)
$\log(GDPPC_{it})$	–0.062 (0.903)	0.273 (0.598)	–0.264 (0.684)	–0.455 (0.560)
$\log(1 + tariff_{ikt})$		3.417*** (0.001)		
Constant	–44.411*** (0.000)	–37.045*** (0.000)	–40.947*** (0.000)	4.980 (0.479)
R2	0.027	0.030	0.036	0.004
Observations	68684	15240	50952	35112
Fixed effects	Exporter HS 4 Product Year	Exporter HS 4 Product Year	Exporter HS 4 Product Year	Exporter HS 4 Product Year

Interestingly, even after controlling for lagged import volume, the coefficient on the lagged number of refusals is positive and 1% statistically significant. The refusals data are clearly quite persistent through time, which is consistent with the existence of an own reputation effect: a history of compliance is associated with fewer current refusals, but a history of non-compliance is associated with a greater number of current refusals. This result lines up well with the findings of Jouanjean (2011), and confirms the intuition of Baylis *et al* (2010). It is more in line with expectations than the counterintuitive finding of Alberini *et al* (2005) that seafood HACCP inspections are not based on compliance history at the plant level.

The model in Table 5.2 column 1 also suggests that sector reputation has a positive and statistically significant impact on the current number of refusals.

Although the coefficient is considerably smaller in magnitude than for the own reputation variable, it is nonetheless 1% statistically significant. In addition to a history of compliance in relation to a given product, therefore, a history of compliance in related products is also important in determining the current number of import refusals. It is important to stress that the count of refusals affecting related products does not include those directly affecting a given exporter–HS 4 digit product combination, so the effect identified by this coefficient is quite independent of the own reputation effect.

The remaining variable in Table 5.2 column 1 is the neighbour reputation effect, based on a 'neighborhood' defined as a country's five geographically closest neighbours. Again, the coefficient on this variable is positive and 1% statistically significant, which is in line with expectations. In terms of magnitude, the neighbour reputation coefficient lies between the own reputation and sector reputation coefficients: its effect is nearly three times as strong as the sector reputation effect, but it is still only one-sixth as strong as the own reputation effect.

Bringing these results together, we find strong support for all three of our core hypotheses: own reputation, sector reputation and neighbour reputation all have a significant impact on the current number of import refusals. In the remaining columns of Table 5.2, we present some simple robustness checks. First (column 2) we include tariffs as an additional explanatory variable. We then (columns 3–4) estimate the model separately for subsamples of countries identified by the World Bank's country income classification. In additional results, available on request, we also estimate the model using alternative estimators (Poisson and, with a dummy dependent variable for at least one refusal, Logit), as well as separately for each World Bank geographical region.

Column 2 of Table 5.2 presents results including data on the US effectively applied tariff rate – that is, including preferences – to assess the degree to which SPS enforcement and protectionist measures are correlated, and to address a potential source of omitted variables bias.[20] Results are very close to the baseline model: all three reputation variables retain positive and 1% statistically significant coefficients, although their magnitudes fall slightly in each case. Interestingly, the tariff variable has a positive coefficient, which is suggestive of stronger SPS enforcement in sectors that are relatively protected, perhaps due to the influence of industry lobbies, as suggested by Baylis *et al* (2010). More broadly, this result could be interpreted as indicating a degree of complementarity between tariffs and non-tariff measures, in this case import refusals. Clearly, more work is required before strong conclusions can be drawn, but the data at this stage are highly suggestive of such a link.

From a policy point of view, it is important to know whether the types of reputation effects highlighted in column 1 of Table 5.2 are common to a wide range of countries, and in particular low- and middle-income countries. Our prior

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20 The sample size in column 2 is greatly reduced due to the lack of availability of tariff data in UNCTAD's TRAINS database.

is that these effects should be stronger than average for low- and middle-income countries, because compliance with standards represents more of a burden – in terms of technical capacity and relative cost – than in high-income countries.

With this outlook in mind, Table 5.2 columns 3–4 present estimation results for the baseline model using restricted country samples, focusing on different per capita income groups, as defined by the World Bank. Column 3 excludes all high-income countries (OECD and non-OECD) from the estimation sample. Contrary to expectations, there is no general evidence of stronger reputation effects: coefficient estimates are close to the baseline, although the magnitude of the sector and neighbour reputation effects are somewhat stronger. Similar findings follow from column 4, where we exclude from the sample upper middle-income countries in addition to high-income countries: the coefficients on sector and neighbour reputation are somewhat stronger than under the baseline. Bringing these results together, we conclude that there is no evidence that the own reputation effect is more important for low- and lower-middle-income countries. On the other hand, the sector and neighbour reputation effects do appear to be somewhat more important for those countries.[21]

5.5   Conclusion, policy implications and avenues for further research

This paper has produced some of the first direct evidence that reputation effects matter in the enforcement of US SPS measures through the import refusals system. Specifically, countries with a history of compliance tend to experience fewer refusals, even after controlling for other factors. In addition, countries with a history of compliance in related products also tend to experience fewer current refusals, as do countries whose neighbours have an established history of compliance. We interpret these last two effects as evidence of reputational spillovers in the enforcement of SPS rules.

From a development point of view, we find some evidence that sector and neighbour reputational effects are more important for lower-income countries. This result sits well with findings in the broader literature on standards and trade, which suggest that it is primarily poorer countries that encounter negative trade effects from foreign product standards (eg Disdier *et al*, 2008).

Although more research is clearly needed in a number of areas – more on this below – some important policy implications would seem to follow from our findings. First, exporters of agricultural products seeking to break into the US market need to focus on building SPS capacity so as to become reliable sources. It is not sufficient to export a mix of compliant and non-compliant goods: reputation matters, and the presence of the latter will make it harder to get the former into the market as well. Consistency and reliability of production are therefore key issues in the development of SPS capacity in poor agricultural exporters.

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21   We also estimated a model for low-income countries only, but the estimates failed to converge.

Second, our results strongly suggest that a comprehensive approach to SPS compliance is likely to be more effective than a piecemeal one. Although it might seem sensible to concentrate limited SPS capacity-building resources on a small number of products that are individually important, such an approach neglects the importance of the sectoral spillover effects evident in our data. Building capacity across the sector as a whole can have important benefits for individual products.

Similarly, the likelihood that regional reputation matters for SPS enforcement also has important policy implications. Regional approaches to the development of standards systems are becoming more common for many reasons, such as the ability for small, poor countries to pool technical and financial resources (Maur and Shepherd, 2011). Our findings suggest an additional reason for encouraging regional standards cooperation: geographical spillovers mean that compliance by a country's neighbours can help it achieve more effective market access.

Currently, there is only a very small literature examining SPS measures at the level of enforcement mechanisms, such as alerts or import refusals. Further work in this area has the potential to bring significant insights into the workings of product standards more generally, and in particular their effects on developing country exporters. Baylis *et al* (2010) make a first attempt to assess the trade impacts of import refusals. Extending their work to take account of the types of reputation spillover effects we have identified here could be a fruitful avenue for future research. Our own work highlights the need to treat import refusals as endogenous in gravity model settings, which is an important dimension in which the robustness of previous assessments needs to be established. Similarly, Baylis *et al* (2009) provide some initial evidence suggesting that political economy forces may be relevant in determining the application of SPS measures. Since almost nothing is known about the political economy determinants of product standards (cf Kono, 2006), this too would be an interesting research question to pursue using data similar to those we have used here.

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APPENDIX

Table 5A.1 *Industry Class Codes for fruit and fruit products*

Industry	Industry type	Class	Class name
		A	Simple
		B	Dried or paste
	Berries	C	Jams, jellies, preserves, marmalades, butters and candied
		D	Juices or concentrates
		F	Purees
		E	Toppings and syrups
		G	Simple
		H	Dried or paste
20	Citrus	J	Jams, jellies, preserves, marmalades, butters and candied
		K	Juices or concentrates
		M	Purees
		L	Toppings and syrups
		N	Simple
		Q	Dried or paste
	Core fruit	R	Jams, jellies, preserves, marmalades, butters and candied
		S	Juices or concentrates
		U	Purees
		T	Toppings and syrups
		G	Simple
		H	Dried or paste
	Pit fruit	J	Jams, jellies, preserves, marmalades, butters and candied
		K	Juices or concentrates
		I	Purees
		L	Toppings and syrups
		S	Simple
		T	Dried or paste
	Subtropical	U	Jams, jellies, preserves, marmalades, butters and candied
21	and tropical	X	Subtropical/tropical fruit pulp
	fruit	R	Purees
		W	Toppings and syrups
		V	Juice, milk, creme, drink or nectar, sub/tropical fruit
		A	Simple
		B	Dried or paste
	Mixed	C	Jams, jellies, preserves, marmalades, butters and candied
		F	Purees
		E	Toppings and syrups
		D	Juices or concentrates

Industry	Industry type	Class	Class name
22	Vine fruit	A	Simple
		B	Dried or paste
		C	Jams, jellies, preserves, marmalades, butters and candied
		F	Purees
		E	Toppings and syrups
		D	Juices or concentrates
	Other fruit	G	Simple
		H	Dried or paste
		J	Jams, jellies, preserves, marmalades, butters and candied
		I	Purees
		L	Toppings and syrups
		K	Juices or concentrates

Table 5A.2 *Industry Class Codes for vegetables and vegetable products*

Industry	Industry type	Class	Class name
24	Bean, pea, corn	A	Simple
		B	Dried or paste
		C	with sauce
		D	Juice or drink
	Fruit used as vegetable	F	Simple
		G	Breaded
		H	Dried or paste
		J	Juice or drink
		K	with sauce
	Leaf & stem vegetable	T	Simple
		W	Juice or drink
		U	Dried or paste
		V	with sauce
	Sprouts from seeds peas or beans	E	Simple
		S	N.E.C
	Fungi products	R	Broken or kibbled
		Q	Pieces and stems, sliced
		P	Whole (button)
25	Mixed vegetables	E	Simple
		H	with sauce
		F	Dried or paste
		G	Juice or drink
	Root & tuber vegetable	J	Simple
		L	Dried or paste
		N	with sauce
		K	Breaded
		M	Juice or drink

6

Sanitary Risk and Concentration in EU Food Imports[1]

MÉLISE JAUD, OLIVIER CADOT AND AKIKO SUWA-EISENMANN

6.1 INTRODUCTION

After a series of highly publicised food scares (bovine spongiform encephalopathy in 1992, dioxin-contaminated chickens in 1999 or bans on genetically modified organisms), public-health concerns have started to loom large in the European Union and resulted in an overhaul of EU food and feed legislation and enhanced oversight. Tightened public mandatory standards are complemented by private standards that are also *de facto* mandatory such as Eurepgap. In addition, public voluntary standards such as ISO norms also apply to agri-food products. In this study, we consider public mandatory standards on food safety.

   Standards of course apply equally to all producers. Yet, they entail several costs of compliance, not only a fixed investment cost at the outset, but also recurring costs associated with traceability requirements ('from farm to fork'), certification or pre-shipment inspection. These costs could price out exporters in poor countries and, hence, impact their access to EU markets (Garcia-Martinez *et al*, 2006; Maskus *et al*, 2005).

   Sanitary standards might all the more act as potential trade barriers for poor countries, for two other reasons. First, the reduction in traditional trade barriers such as tariffs and the rising number of preferential schemes result in most of EU agro-food imports entering duty free. In contrast, the impact of remaining barriers such as standards appears all the more significant. Second, EU imports of farm products (which is the world's largest market for developing countries) has recently evolved from traditional tropical goods such as coffee, cocoa and spices to fresh produce such as fruits, vegetables or fish. These products are potentially more concerned by sanitary risk.

   This chapter examines the link between the sanitary risk of food products and recent changes in the EU food import pattern. We build a product-specific measure of sanitary risk using a database that reports all food alerts at the EU border. As will be seen, the incidence of food alerts is fairly heterogeneous

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[1] This is a shorter and non-technical version of Jaud *et al* (2010). This project was part of Jaud's Ph.D. dissertation at the Paris School of Economics.

across exporting countries. This implies that a raw count of alerts by product cannot measure correctly its sanitary risk. For instance, a product imported overwhelmingly from a country with weak quality standards would appear as risky even though other exporters might have managed to make the product safe. In addition, the incidence of alerts is likely to be correlated with the frequency of controls, which might be non-random. Inspections may reflect a particular exporter's past performance or hidden protectionism. Hence, we rely on a two-step procedure. In the first step, we wipe out the various factors that might affect the incidence of food alerts independently of the characteristics of the product and we estimate a product-specific Sanitary Risk Index. Then, in a second step, we relate this Sanitary Risk Index to the pattern of EU food imports.

The evolution of EU foodstuff import pattern results from the interplay between diversification and concentration forces. First, an exogenous taste for variety, or a desire to limit monopoly positions leads to a larger number of suppliers. Over time, the decrease in trade costs, such as transport costs and tariffs, also implies a diversification of import sources, as more countries are able to export to the EU. Moreover, the overall productivity growth that goes along with development triggers entry into the EU market of poor countries which used to lie below the required threshold of productivity (in a setting where suppliers are characterised by heterogeneous productivity level).

However, in the case of goods with particular safety concern the importer needs to source from reliable producers. Hence, there is a trade-off between concentrating on top quality suppliers and keeping several suppliers in order to test them. As new exporting countries get on the EU's list of suppliers, they need to build a reputation of quality. Typically, these countries will enter into the EU markets on a small scale and increase the size of their shipments as they are gradually revealed as reliable producers, while incumbent exporters are never completely immune from food safety crisis. The tradeoff between these two diverging forces evolve over time, hence the evolution of the EU food product import pattern is open to empirical scrutiny.

We find evidence that product sanitary risk has indeed affected the European Union's pattern of imports. Overall, there is a slight diversification of import sources over time. This overall trend hides diversification at the extensive margin and concentration at the intensive margin, the more so for risky products. On the one hand, EU agri-food imports are being increasingly sourced from a few countries. On the other hand, additional new countries enter the EU market, on a smaller scale than before, especially if their exports entail some risk. As a result, EU foodstuff imports gradually evolve towards a two-tier distribution with a small number of dominant suppliers and a growing fringe of marginal ones.

Our work relates to two distinct lines of research. First, this work contributes to the literature on the potential impact of Sanitary and Phytosanitary (SPS) standards as barriers to trade. EU standards in particular are often more specific

and restrictive than multilateral Codex ones[2] and have been suspected of going beyond the requirements dictated by mere sanitary concerns. An important set of works has focused on the quantitative assessment of the trade effects of standards. Most of them have included standards (as dummy variables signalling their existence in a given tariff line) as explanatory variables in gravity equations. Otsuki *et al* (2001) found that a 10% tighter aflatoxin standard in the EU would be associated with an 11% reduction in edible groundnut imports. Moenius (2006) extended the analysis to all agricultural products. His results provide a much more balanced picture: while some country-specific standards tend to reduce trade, others promote it, depending on the complexity of the good and on the type of the standard itself (country specific versus harmonised standard). Harmonisation of standards across countries may increase trade in some cases, despite the loss in the variety of exchanged goods and regional approaches to standards, such as the EU, can have significantly different effects on insider and outsider countries. Overall the protective effects of standards increased during 1980 and 1995. Crucially, the impact of importing country standards varies with the level of income of the exporting country, with negative effects being more likely vis-à-vis developing country exporters (Disdier *et al*, 2008). Moreover EU imports are more negatively affected by SPS measures than imports of other OECD countries, suggesting a higher stringency of the EU market. Another set of works, largely based on detailed case studies, has provided further nuance and highlights the fact that gravity model findings tend to represent short-run, average, or aggregate effects. In particular, short-run studies miss the catalysing role that product standards may play in the medium run by promoting quality upgrading and technical progress in developing countries (Diaz Rios and Jaffee, 2008; Henson and Jaffee, 2004, 2008, Jaffee 2003; World Bank, 2005).

Second, this work relates to the literature on trade patterns along the development process. Imbs and Wacziarg (2003) have shown that the degree of diversification of production and employment follow an inverse U shape along development. Klinger and Lerderman (2004), Cadot *et al* (2011), and Dutt *et al*, (2008), document a similar hump shaped pattern for exported products. As to geographical diversification, micro studies suggest a role for proximity and experience gained in the destination markets. A country starts exporting to one market and gradually expands to neighbouring countries (Evenett and Venables, 2002). This stylised fact finds further support in Eaton *et al*'s (2007) detailed study of Colombian exports. Recently, Amurgo-Pacheco and Pierola (2008) explored both types of diversification, by products and partner countries. This rapidly growing line of research also relates to the numerous works that build on Melitz (2003) and stress the heterogeneity of firms and their differing ability to export.

We differentiate ourselves from the existing literature in three important ways. First, we adopt an *ex-post* approach and consider *effective* product sanitary risk

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2   Codex Alimentarius Commission is a body created by the Food and Agriculture Organisation of the United Nations (FAO) and the World Health Organisation (WHO).

based on real food alerts at the EU borders. Our *ex-post* approach complements previously cited studies that are based on the existence of a standard on a given product: the latter, by contrast, could be considered as *de jure* measures of sanitary risk. Second, contrary to previous papers, we take the view point of the importer and not of the exporter. Finally, we shift focus from gravity modelling to an analysis of the geographical concentration of EU foodstuff imports, using the Theil index. The separability property of the Theil index enables us to decompose the overall geographical concentration into variations at the extensive and intensive margins.

The rest of the chapter is structured as follows. The next section describes the data, in particular the EU Food Alerts database. Section 6.3 details our empirical strategy. Section 6.4 reports the main empirical results and Section 6.5 concludes.

6.2 DATA

6.2.1 *The Food Alerts database*

We use EUROSTAT's Rapid Alert System for Food and Feed (RASFF). The RASFF is a system of notification and information exchange on emergency sanitary measures taken at the border by EU Member States. It does not include information on intra-EU trade. The system in place since 1979 was incorporated in the EU food regulation in 2002 after major food scares. It involves the Member States, the European Commission and the European Food Safety Authority (created in 2001).

The database records all notifications (19,000) between 2001 and 2008 with the identity of the importing EU Member State, exporting country, product, hazard, type of notification, and type of measure. The database contains complete information regarding products in verbal form and products are not coded into the CN system. We painstakingly coded all products into CN8 categories over the period 2001–2005 (8,895 observations). We consider imports from EU-12 Member States so as to be consistent with the trade data over a longer period.[3] Thus, we created an entirely new database of food alerts.

It is important to make two remarks at the outset. First, products enter the database only if they are exported to the EU and subject to a sanitary or phytosanitary standard. Moreover, it is unlikely that inspections are purely random. They could reflect the concern of inspection services with respect to certain firms exporting a given commodity from a particular country. In the following econometric exercise, we will try to control for these selection biases. The firms' targeting will be smoothed out anyway, as notifications are recorded at the country level. Hence, despite these caveats, we believe that the RASFF

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3   France, Belgium-Luxembourg, the Netherlands, Germany, Italy, Ireland, United Kingdom, Denmark, Greece, Portugal and Spain. We use this restrictive definition for consistency of time series, as the source of the trade data, EUROSTAT, does not provide data on Member States before their accession.

database provides reliable information on the effective degree of food imports safety.

Notifications can be of two types: 'information' or 'alerts'. In the case of information, the hazard is deemed limited; the importing Member State imposes a measure (e.g. destruction of the shipment) and informs the rest of the Community of the problem, but other members do not follow suit. In the case of notification, the hazard is deemed sufficiently serious to warrant simultaneous action at the Community level.

Panel (a) of Figure 6.1 shows the evolution over time of the number of notifications and its decomposition between information and alerts. The total number of notifications shows a sharply rising trend, although somewhat decelerating after 2003. Information notifications outnumber alerts by a ratio of more than six to one on average over the period.

Panel (b) highlights the substantial heterogeneity among notifying EU States in the frequency of notifications taking the average over the period 2001-2005. Germany (23% of observations) Italy (21%) and Spain (18%) are the top notifying countries, while Ireland accounts for only 0.39% of notifications. This may reflect the differing agri-food imports structure of EU Member States. It could also highlight the fact that inspections are not operated uniformly across the EU. Thus, in the following econometric analysis, notifications are aggregated across all EU Member States and all years, in order to smooth out these variations.

Regarding exporters' region of origin, Asian countries are the most affected by notifications, followed by European countries and they are steadily on the rise after the turn of the century. Other regions are less affected and the number of notifications seems even to slightly decrease after 2003 for Latin American countries or stabilise after 2004 for African countries (panel c).

There is also considerable heterogeneity among products (panel e), with fruits and nuts, fishery products, coffee and spices ranking highest. In terms of hazards, the main cause of notifications for agricultural products is contamination by mycotoxins (mainly aflatoxin), which alone accounts for almost 40% of the notifications (panel f). The second cause is contamination by residues of veterinary medicinal products (chloramphenicol, nitrofuran and tetracycline) which together account for 14% of the notifications. Then comes the presence of pathogenic micro-organisms (12%) and contamination by pesticide residues (3%).

Notifications, whether alerts or information, induce very strong actions. Over 85% of notified shipments were stopped at the border in 2005. In 26% of the cases, shipments were destroyed. The rest (45%) were re-dispatched to other destinations; they did not penetrate the EU market but would nevertheless end up on somebody's plate. An additional 14% of imports were banned (panel d).

Figure 6.1 *The food alerts database, 2001–2005*

(a) Total notifications, information and alerts, 2001-2005

(b) Notification by Member State, average 2001-2005

(c) Notifications by exporting regions, average 2001-2005

(d) Notifications by CN2 sectors, average 2001-2005

(e) Notifications by hazard category, average 2001-2005

(f) Actions taken post notifications, average 2001-2005
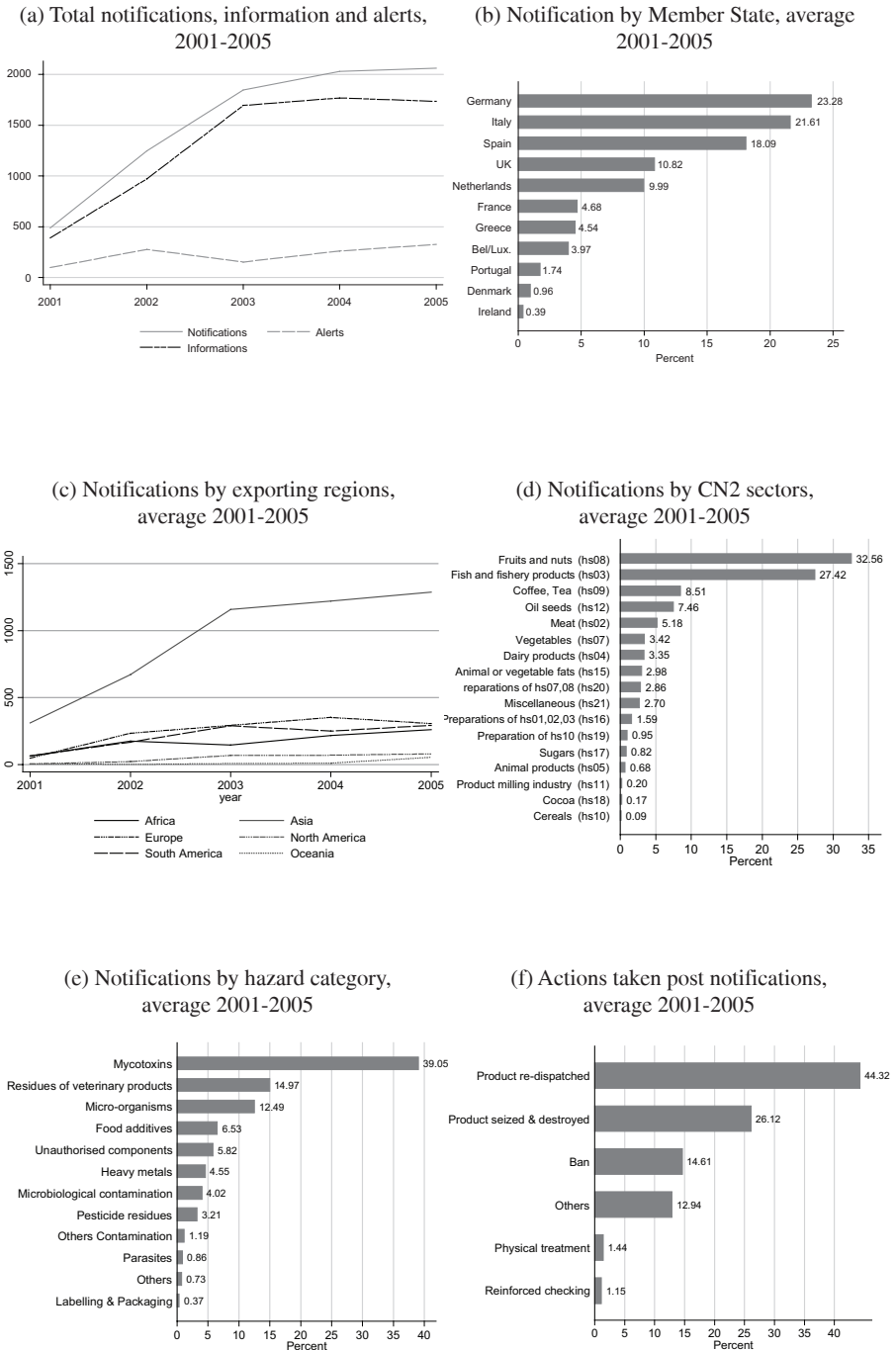
Figure 6.2 shows a scatter plot of exporter total number of notifications between 2001 and 2005 against their level of development in 2001, both taken in logs. The size of the circles is proportional to the country's share in EU imports. China, Turkey and Brazil are most affected by SPS notifications, but they are also among EU's largest suppliers. Countries like Canada, New Zealand or the USA are large exporters, but subject to relatively few notifications; at the other end of the spectrum, Iran and Vietnam suffer a disproportionate number of notifications given their relatively lower import shares. This dispersion suggests that important country-specific characteristics, on top of sales volumes, affect the probability of getting a notification. These characteristics include obviously the product composition of exports, as well as unobserved characteristics of national production systems which must be taken into account when assessing the level of product-specific sanitary risk.

Figure 6.2 *EU food alerts notifications by the exporting country's level of development*
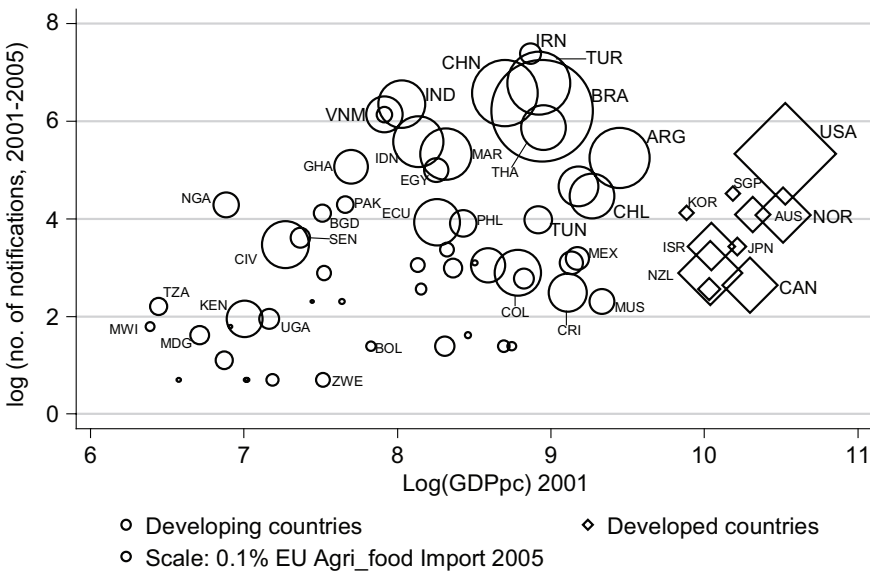
6.2.2 European agri-food imports

We use EUROSTAT agri-food import data for EU-12 at the CN8 level (the highest level of disaggregation available, as EUROSTAT does not make 10-digit data available to researchers). Agri-food products, excluding beverages and animal feed, are in Chapters 1 to 21 of the CN system, which represent 3,073 potential export lines. With 147 partner countries (exporters) including 122 developing

countries, we have a three-dimensional panel where the unit of observation is a product imported by the EU from an extra-EU partner in a given year.[4]

Table 6.1 shows the evolution of the structure of EU agri-food imports between 1988 and 2005. The share of developing countries, already dominant at 66% in 1988 increased further to 75% in 2005. Interestingly, this rise is not attributable to traditional tropical products (such as coffee, cocoa or sugar) which, as a share of imports from developing countries, shrank from 23.9% to 15.4% over the sample period. Rather, it is due to horticulture and fisheries products, whose share rose from 21.7% to 29.6% of EU agri-food imports from developing countries. Hence, the EU has been importing more fresh horticulture and fisheries products from developing countries over time, a noticeable evolution as fisheries and horticulture products are sensitive to sanitary and phytosanitary issues, and the ability to meet stringent SPS standards is correlated with exporter income.

Figure 6.3 shows the distribution of EU imports by number of source countries. The distribution is strikingly skewed, with single supplier country (there may be several supplying firms per exporting country) accounting for over 12% of the total number of transactions. This highlights the high degree of market concentration among agri-food products, with a peak at one supplier country, and an average number of 12.

The number of sourcing countries varies across sectors, however. The dairy products sector is extremely concentrated with almost 40% of transactions involving a unique partner. On the contrary, the vegetable plaiting material or coffee and tea sectors exhibit no single-partner transactions. This apparent heterogeneity across sectors requires controlling for product characteristics in the subsequent analysis of concentration over time. In 2001–2005, the number of potential suppliers ranged from 10 and 147 (the total number of EU partner countries), depending on the product (defined at the CN8 level), with a mean of 78 potential suppliers. During the same period, the average number of active suppliers was only 12, and ranged from 1 to 96 depending on the product (Table A1 in the Appendix).

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4   At the CN8 level, reclassifications are frequent. Five types of reclassification can be distinguished: (i) creation of a new code corresponding to a new product; (ii) creation of several new codes by splitting a former one; (iii) creation of a new code by merging several former ones; (iv) creation of new codes resulting from a change in the coding system (CN harmonisations in 1988, 1996 and 2002); and finally (v) termination of old codes. Of the 3,073 CN8 codes available in our dataset, only 37.7% are unaffected by reclassification between 1988 and 2005. Of the remainder (62.3%), 1.6% are new products (type i), and 0.7% are terminated codes (type v). This leaves 60% of reclassifications of 'continued' products. Among those, half (30%) are type-ii reclassifications (splittings) and half are type-iv (system changes). In order to reduce the inconsistencies introduced by type-iii and type-iv reclassifications to a minimum, we used EUROSTAT's documentation to re-reclassify new codes into initial ones; in case (iii), where a new code was made out of several old ones, we used the first parent's code in the CN order. This gives us a consistent database using the initial nomenclature throughout the sample period.

Table 6.1   *Structure of EU agri-food import (in percentage)*

Description	Developing countries (extra EU)		Developed countries (extra EU)		Total Imports	
	1988	2005	1988	2005	1988	2005
Traditional tropical products	*23.9*	*15.4*	*1.0*	*1.5*	*24.9*	*16.9*
Coffee, tea, mate and spices	15.7	7.4	0.1	0.3	15.8	7.6
Lac, resins, gums	0.5	0.5	0.2	0.2	0.7	0.7
Sugars and sugar confectionery	2.8	2.4	0.4	0.5	3.3	2.8
Cocoa and cocoa preparations	4.8	5.1	0.3	0.6	5.1	5.7
Tempered zone products	*4.2*	*6.7*	*8.4*	*5.3*	*12.6*	*11.9*
Live animals	0.1	0.0	0.5	0.0	0.6	0.0
Meat and edible meat offal	2.1	3.2	2.6	2.4	4.7	5.6
Dairy produce	0.2	0.3	1.9	1.0	2.2	1.4
Products of animal origin	0.9	1.1	0.5	0.2	1.4	1.4
Cereals	0.9	1.9	2.8	1.6	3.7	3.5
Fish and horticulture	*21.7*	*29.6*	*12.3*	*12.3*	*33.9*	*41.9*
Fish, crustaceans and molluscs	5.6	11.1	6.9	7.0	12.4	18.1
Live trees and other plants	0.7	1.9	0.6	0.5	1.2	2.4
Edible vegetables	5.0	3.4	1.2	1.3	6.1	4.7
Edible fruit and nuts	10.2	13.1	3.6	3.4	13.8	16.5
Vegetable plaiting materials	0.3	0.2	0.1	0.0	0.4	0.2
Others	*16.4*	*23.0*	*12.2*	*6.3*	*28.6*	*29.3*
Products milling industry	0.1	0.1	0.1	0.0	0.1	0.1
Oil seeds and oleaginous fruits	5.1	6.2	7.2	2.5	12.3	8.7
Animal and vegetable fats	3.7	6.7	1.1	0.3	4.8	7.0
Preparations of meat and fish	2.9	5.3	1.7	1.0	4.6	6.3
Preparations of cereals	0.1	0.4	0.3	0.6	0.4	1.0
Preparations of vegetables, fruit or nuts	4.1	3.6	1.3	0.3	5.5	3.9
Miscellaneous preparations	0.4	0.7	0.5	1.5	0.9	2.2
Total	66	75	34	25	100	100

Note: In 2005, traditional tropical products represented 16.9% of EU total agri-food imports, out of which 1.5% came from developed countries and 15.4% from developing countries.

Figure 6.3 *Frequency of number of active suppliers (% in total number of transactions)*
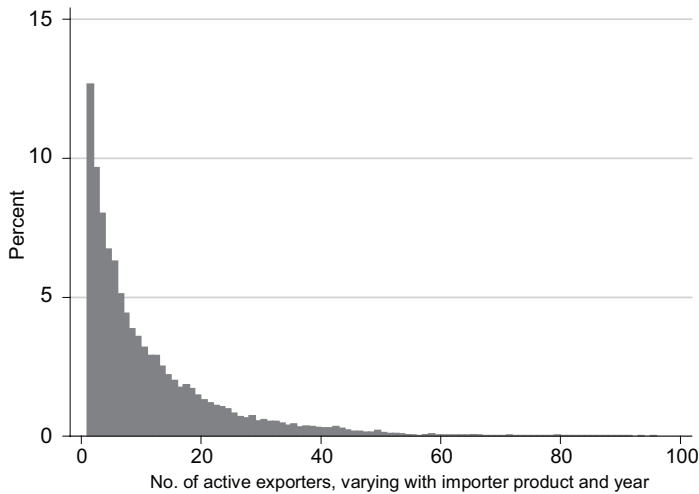
6.3 EMPIRICAL STRATEGY

6.3.1 The Sanitary Risk Index

The level of sanitary risk associated with imported agri-food products can result from (i) intrinsic product characteristics, as some products are more vulnerable than others to contamination; (ii) supplier characteristics, as some producers are more able than others to apply necessary controls; or (iii) a combination of both. Hence, a raw count of alerts by product cannot give a correct measure of product sanitary risk. We rely thus on a two-step procedure, where in the first step, we estimate a measure of sanitary risk at the product level based on the count of food alerts at EU borders and controlling for the influence of confounding factors such as the characteristics of the exporting country or some protectionist motive of the importer country. In a second step, we relate the geographical concentration indices to this estimated measure of risk. The sample period is restricted to 2001–2005 where both trade and notification data are available. This section details both steps of the procedure.

The Sanitary Risk Index (SRI) is computed using the EU food alert database, described in Section 2. For a product k and an exporter c, the dependent variable is the combined count of notifications from all twelve EU Member States between 2001 and 2005.[5] The unit of observation is an exporter*product pair and the regression is cross-sectional. Our variable of interest is the coefficient on the product dummy, δ_k, in the following regression:

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5   As there are consistent differences in the number of notifications among notifying EU states and across years, all observations are pooled across all importing (notifying) countries and all years.

$$Alert_{ck} = f(\alpha Imp_{share}{}_{ck}^{EU} + \beta controls_k + \delta_k + \delta_k + \varepsilon_{ck})$$

where ε_{ck} is an error term.

Because the number of notifications is a count (with over-dispersion and a large proportion of zeros), estimation is made with a negative binomial. We include exporter c share in EU imports of product k $Imp_{share}{}_{ck}^{EU}$ in 2000 (one year before the sample start). Indeed, a product imported overwhelmingly from a country with weak quality standards would appear as risky even though other exporters might have managed to make the product safe. In addition, the incidence of alerts is likely to be correlated with the frequency of inspections. The latter may not be purely random: they may reflect a particular exporter's past performance or hidden protectionism. Hence, we include trade barriers, such as the *ad-valorem* equivalent of the EU's most favoured nation (MFN) tariff on product k in 2005, dummy variables indicating whether product k is affected by a quota during the sample period, or has been the object of a dispute at the WTO involving the EU and any other country, and whether exporter c has been affected by a ban on product k during the sample period. Indeed, a ban could result in fewer notifications not because of a lower risk but because of its mere impact on trade flows. We also control for the initial value of EU imports of product k in 2000, as products imported in large volumes are likely to be inspected – and therefore, fail inspections – more often than others. We also add an exporter fixed effect that controls for all supplier's characteristics that may affect the quality of the product, such as the overall level of economic development. As a consequence, the coefficient of the product dummy captures the part of food alerts that is due to product characteristics, net of exporters' characteristics and of other factors that may affect the probability of rejection and is what we label the estimated product's Sanitary Risk Index.[6]

6.3.2 The impact of sanitary risk on EU import pattern

Theil index
In order to investigate how rising sanitary risk of agri-food products affect the geographical pattern of EU imports, we need a summary index of the concentration of import sources. We use the Theil entropy index (Theil, 1972), which compares the actual distribution of market shares among suppliers to what would be an equal distribution. The index varies from zero (perfect equality) to one (perfect inequality). The Theil index has the property of putting a larger weight on both extremes of the distribution. Hence, it is adequate in capturing the action in the first tier of the distribution, where suppliers will be shown entering the EU market small scale.

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6   When estimated coefficients were not significant at the 10% level, they were set equal to zero.

Omitting the time indices, for good k, the Theil index is given by:

$$T_k = \frac{1}{n_k} \sum_{c=1}^{n_k} \frac{x_k^c}{\mu_k} \, ln\left(\frac{x_k^c}{\mu_k}\right)$$

where

$$\mu_k = \frac{1}{n_k} \sum_{c=1}^{n_k} x_k^c$$

is the average value of import for good k from origin country c and n_k is the total number of countries exporting good k. More precisely, n_k is the number of 'potential exporters' as not all countries can produce a specific agricultural crop because of required type of soil and climate. Here, a *potential exporter* is defined as a country that has exported good k to some destination in the world (not necessarily an EU country) at least two years in a row over the sample period. We impose the requirement of two consecutive years of exports in order to ensure that the exporter is a successful one. Indeed, Besedes and Prusa (2006a, 2006b) show that many countries export only one year and fail, while two years is the median duration of export spells. This definition of potential exporters has the advantage of being time invariant and allows comparing Theil indices over time.

Intensive versus extensive margins
The Theil index can be decomposed as the sum of what happens at the intensive margin (among incumbent exporters) and what happens at the extensive margin (allowing entry and exit of exporters). Thus we define n_{kt}^{EU} as the number of *active suppliers* of good k in year t, that is the countries that are effectively selling to any EU country that good k in year t. We have seen earlier that the number of active suppliers, which varies every year, is different from the number of potential suppliers that is time-invariant.

A simple computation, presented in the Appendix, shows that the Theil index at the extensive margin is a function of the inverse of the number of active suppliers. The intuition is simple: when the number of active suppliers increases, there is less inequality and hence, more diversification of sourcing countries:

$$T_{kt}^B = ln\left(\frac{n_k}{n_{kt}^{EU}}\right)$$

Thus, the changes in the between-groups component of the Theil index trace exactly the percentage changes in the extensive margin defined as the number of active suppliers (as the set of potential exporters, n_k is time invariant):

$$\Delta T_{kt}^B = T_{kt}^B - T_{kt-1}^B = -\Delta ln \, n_{kt}^{EU}$$

On the other hand, the Theil index at the intensive margin is simply the index computed over active suppliers n_{kt}^{EU}:

$$T_{kt}^W = \frac{1}{n_{kt}^{EU}} \sum_{c=1}^{n_{kt}^{EU}} \frac{x_k^c}{\mu_{kt}^{EU}} \; ln\left(\frac{x_k^c}{\mu_{kt}^{EU}}\right)$$

Explaining concentration patterns with the Sanitary Risk Index
The product's Sanitary Risk Index estimated previously is then thrown as an explanatory variable of the concentration indices, in a panel regression, where the unit of observation is a product*year pair:

$$C_{kt} = \alpha + \beta Control_{ck} + \gamma \hat{\delta}_k + \mu. \hat{\delta}_k . \delta_t + \delta_t + \delta_s + \vartheta_{kt}$$

where C_{kt} is a measure of concentration (resp. Theil index or its within or between component, or the number of active suppliers) in year t of good k belonging in sector s. Control variables are the same as before. Sector fixed effects (at CN-4 level) control time-invariant characteristics at the sector level that may also affect the concentration. As the product dummies used in this second step are generated variables, standard errors are computed with a bootstrap.

6.4 EMPIRICAL RESULTS

6.4.1 The Sanitary Risk Index

The Sanitary Risk Index, estimated in the procedure presented in the previous section ranges between 0 and 12.2, with a mean at 0.76 (Table A1). It is a rather conservative measure of risk, because non-significant estimates are assumed to have a zero risk. The distribution of significant point estimates is shown in Figure 6.4. No product chapter stands out as having particularly high risk levels, except for fisheries products, with mussels as an unsurprising outlier (sector 3). Remarkably, traditional tropical products such as coffee (sector 9) and cocoa (sector 18), whose share in EU foodstuff imports is as noted before, declining, are among the safest products.

Figure 6.4 *Distribution of point estimates of Sanitary Risk Index*
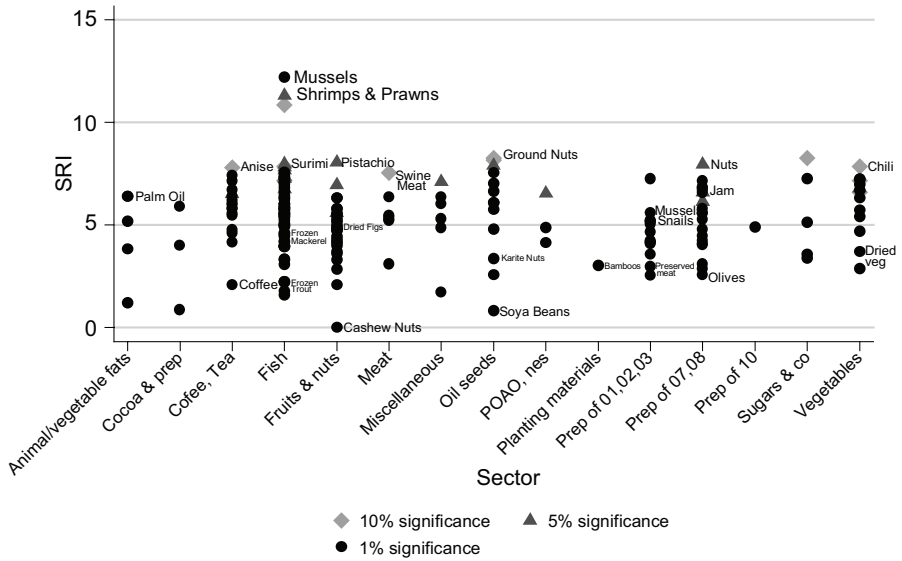
Table 6.2 lists the agri-food sectors ranked by the Sanitary Risk Index, with the number of 'risky' products – defined as products with a positive Sanitary Risk Index – per sector, as well as the number of alerts and the most frequent reason for rejection. Sectors estimated with the highest sanitary risk are not necessarily those with the highest observed number of alerts. The case of edible fruit and nuts is a striking example. Most of the 3,210 alerts in this sector are attributable to one single supplier, Iran's aflatoxin-contaminated pistachios. After controlling for that, the edible fruit and nuts sector ranks only sixth in terms of sanitary risk while fishery products and spices emerge as the riskiest.

Table 6.2   *Sanitary Risk Index, number of alerts and cause of rejection by sectors*

Description	# 'risky' products	Sanitary Risk Index	# Alerts 2001–5	Most frequent cause for rejection
Coffee, tea, mate, spices	38	2.07	934	Composition, mycotoxins
Preparations of meat & fish	32	1.29	309	Residues drugs
Oil seeds and oleaginous fruits	25	1.04	1491	Mycotoxins
Fish, crustaceans & molluscs	108	0.95	2641	Residues drugs
Miscellaneous edible preps	7	0.85	185	Food additives
Edible fruit and nuts	53	0.71	3210	Mycotoxins
Edible vegetables	27	0.65	441	Pesticide residues
Cocoa and cocoa prep.	4	0.57	20	Allergens
Prepared vegetable, fruit,nuts	44	0.54	677	Mycotoxins
Sugar	5	0.49	221	Food additives mycotoxins
Products of animal origin	3	0.48	40	Residues drugs
Meat and edible meat offal	17	0.24	498	Pathogens
Animal or vegetable fats	7	0.18	247	Composition
Preparations of cereals	2	0.16	167	Radiation
Dairy produce	0	0.03	367	Residues drugs
Live animals	0	0	1	Heavy metals
Live trees and other plants	0	0	0	
Cereals	0	0	158	GMO/mycotoxins
Milling industry products	0	0	36	Food additives
Resins, gums	0	0	1	Food additives
Vegetable plaiting materials	1	0	1	Labeling incorrect

Note: Risky products are products with a positive Sanitary Risk Index. Out of a total of 2,146 CN8 products, 373 are risky products. In column (2) we compute the Sanitary Risk Index at the CN2 level, taking the average overall CN8 product in each CN2 sector. Column (3) reports the total number of alerts per CN2 sector, over the period 2001–2005. The last column details the most frequent cause for an alert.

Table 6.3 goes in further detail and lists the ten most and least risky products. It turns out that not all fish products are risky, depending on the species and the preparation (fresh versus frozen).

Table 6.3   *The ten most and least risky products*

	Product	Risk Index
Most risky		
	Mussels	12.208
	Shrimps	11.314
	Fresh tuna fillets	10.859
	Ground-nuts-shell	8.259
	Seeds	8.153
	Pistachios	8.063
	Fish fillets	7.973
	Nuts – seeds	7.951
	Seaweeds – algae	7.914
	Dried cuttle-fish	7.866
Least risky		
	Soya	0.82
	Cocoa	0.876
	Oil – palm	1.217
	Salmon	1.612
	Food preparations	1.725
	Frozen cod-fillets	1.781
	Nuts-fruits	2.086
	Coffee	2.089
	Prawns-shrimps	2.179
	Hake-fillets	2.25

Figure 6.5 plots the number of notifications and the Sanitary Risk Index at the product level. The correlation between the raw number and the estimated risk is quite low. Hence, controlling for exporting country characteristics or bilateral trade policies seem indeed to matter. Figure 6.5 also distinguishes between food types, such as fresh, frozen or prepared food. Understandably, fresh produce are in general more risky, but prepared foods such as prepared fish, chutney or mustard also appear in the top quartile.

To our knowledge, this product-specific measure of sanitary risk is new in the literature. It is an *ex-post* measure of the level of effective risk based on real food alerts at the EU border. This index shows how food safety regulations translate into inspections and rejections of non-compliant shipments. As such, it complements other *de jure* measures that rely on the existence of public legal standards. Disdier *et al* (2008) give such a *de jure* measure, which is the number of standards for a given (HS6) product, notified by any country to the WTO. The coefficient of correlation between this measure and the Sanitary Risk Index is only -0.05. This low correlation might come from different reasons: first, it could be the sign of a discrepancy between world practice and that of the EU.

Moreover, this correlation compares the number of WTO notifications at the HS6 level and a more disaggregated risk index which is estimated at the HS8 level. In addition, a lot of products have at least one notification from any country in the world, while few products, once controlled for exporting country characteristics and the endogeneity of the inspections, are estimated as having a positive SRI.

Figure 6.5 *Sanitary Risk Index and number of notifications in the RASFF database*
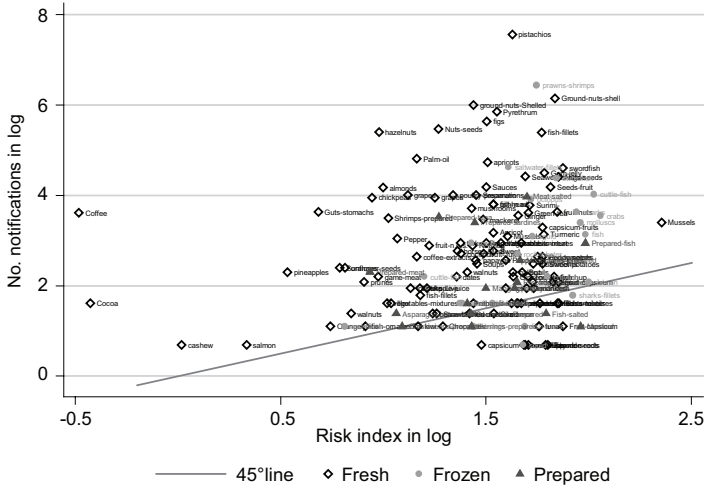
Figure 6.6 *Evolution of EU import concentration*
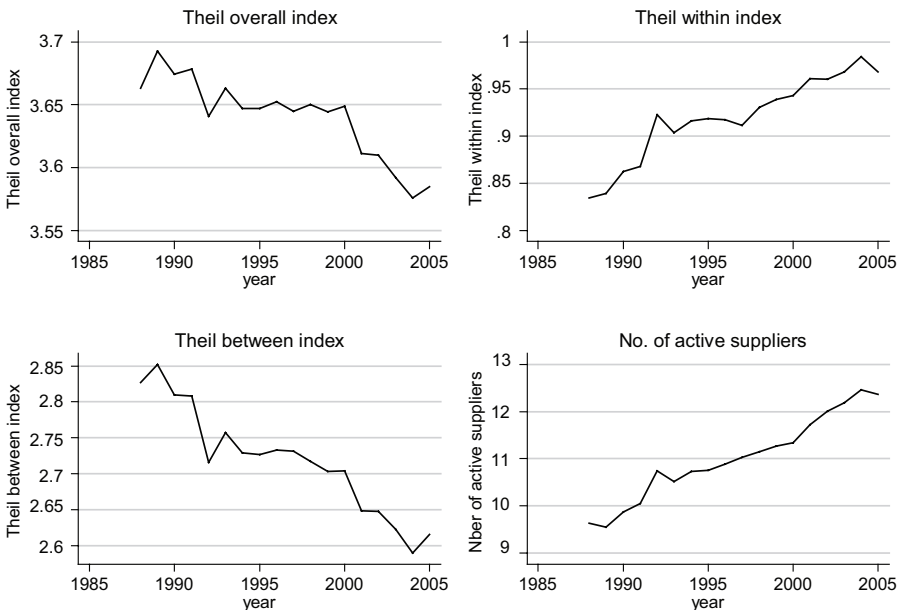
6.4.2 *Geographical pattern of EU agro-food imports*

The average number of potential suppliers is high, at around 78 suppliers, in contrast with the average number of actual suppliers which is just around 12 (Table A1). Concentration indices are very high, with a Theil index at 3.30 and a Gini index at 0.74. This is consistent with our earlier observation that the distribution of the number of active suppliers is highly skewed. It could also be partly due to the very detailed level of disaggregation (CN-8 digit).

Figure 6.6 re-places the 2001–2005 data in a broader perspective and shows the evolution of simple averages, over all products, of the geographical concentration indices between 1988 and 2005. The downward trend of the Theil overall index indicates that geographical diversification has occurred over time. It is paralleled by a similar downward trend of the between-component of the Theil index, along with a rising number of active suppliers; both signs suggest a diversification at the extensive margin. However, the Theil within-group component shows an upward trend and points to a rising concentration among active suppliers. These trends are accentuated after 2000.

Thus, we get the following picture: on the one hand, supplier concentration is rising at the intensive margin, meaning that the top suppliers get larger relative to the average. On the other hand, concentration is decreasing at the extensive margin, as more suppliers are added to the EU's portfolio of suppliers. These apparently diverging observations can be reconciled as follows. Suppose first a group of three incumbent suppliers with unequal export levels to the EU, say, $4, $3 and $2 respectively, with two more potential suppliers waiting in the wings with zero exports to the EU. The Theil index within active suppliers is 0.04. Suppose now that a new supplier enters the EU, with exports of only $1. As there is one additional supplier, there is diversification at the extensive margin. However, the group of active suppliers is now more unequal, as the largest exporter is 4/2.5 = 1.6 times the group average. Hence, the within-Theil index rises to 0.2. Thus, the pattern that is observed in the data is consistent with an additional entry of small-scale suppliers into the EU market that results in both diversification at the extensive margin and concentration at the intensive margin.

6.4.3 *Product risk and geographical concentration*

We now focus the analysis on the relationship between public-health concerns and the concentration of EU suppliers. Product riskiness has a significant and negative impact on geographical concentration of EU agro-food imports. The coefficient of sanitary risk is indeed negatively correlated with the overall Theil index (Table 6.4, column 1), controlling for EU protectionist motives, product and time fixed effects. This overall trend hides two diverging evolutions. At the intensive margin, concentration is higher for riskier products (column 2); on the other hand, at the extensive margin, concentration is lower for those risky products (columns 3) and the number of suppliers is higher (column 4). Coefficients in column (2) and (4) imply that a 1% increase in the level of sanitary risk results

in a 5.8% (0.0735*0.76/0.96) increase in the level of concentration among active suppliers and a 12.7% (2.0193*0.76/12) increase in the number of suppliers to the EU.

Table 6.4   *EU import pattern and Sanitary Risk Index*

	(1)	(2)	(3)	(4)
Dependent variable	Theil overall	Theil within	Theil between	No. of active suppliers
sanitary_risk_k	−0.0675***	0.0735***	−0.1422***	2.0193***
	(−0.009)	−0.008	(−0.011)	(−0.209)
Observations	8,602	8,608	8,608	8,608
R-squared	0.336	0.39	0.467	0.428

Note: All regressions are estimated using OLS and control for the existence of a tariff, a quota, a ban, or a dispute on the product considered over the period, sub-sector (CN4) and time fixed effects. Bootstrapped standard errors are in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Figure 6.7 illustrates further the polarisation between the top and smallest exporters. Panels (a) and (b) show the first and last quartile import share distribution in 2005 for risky versus safe products. Risky products are, as before, defined as products with a positive risk coefficient. For the smallest partners (last quartile of the import share distribution), the curve for risky products shifts to the left compared to the curve for safe products. However, the two curves for the top exporters (first quartile of the import share distribution) are very similar and overlap. Thus, there is a rising polarisation between the bottom and the top of the distribution, especially for risky products. A possible explanation for the fact that entrants begin small scale in the presence of risk, is that they are being tested. Alternatively, exporters would want to 'try the market' small scale before taking big risks (Rauch and Watson, 2003).

Figure 6.7 *Import share distribution, for risky and safe products, 2005*

(a) Smallest exporters, last quartile

(b) Biggest exporters, first quartile
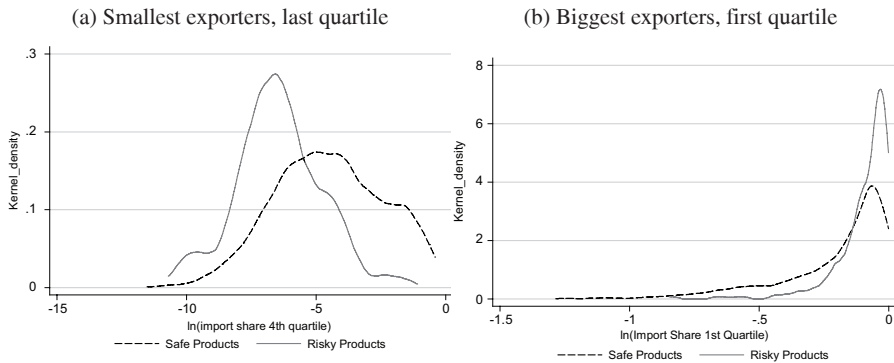
6.5 Concluding remarks

This chapter establishes a stylised fact on EU import concentration in agri-food products and makes a link between this import pattern and rising public-health concerns in EU food policy.

While previous empirical work have focused on a *de jure* definition of standards or their *ex-ante* impact on trade flows, this chapter is, to our knowledge, the first to assess their *ex-post* and effective impact. Using for the first time a dataset on food alerts that provide information on the implementation of SPS standards by EU importing countries, it contributes to the empirical debate on the evolution of geographical concentration of EU agri-food imports across time.

The results are clear. EU foodstuff imports over the period 1988–2005 have gradually evolved towards a two-tier distribution with a small number of increasingly dominant suppliers and a growing fringe of marginal ones. European importers tend to buy their agri-food products from an increasingly large portfolio of suppliers, but large orders are concentrated on a small number of reliable suppliers. This evolution is more marked for products that entail a sanitary risk according to the EU regulation. The explanation put forward for such a pattern is a search for food safety from the buyer with sellers building up reputations. However, the paper does not explicitly test for this mechanism. Other mechanisms may also contribute to this pattern: first, our results may be capturing the increasing vertical integration of global food supply chains, along with the rise in foreign investment both in food processing and retailing sectors and the dominance of large multinational food companies; second, concentration at the intensive margin might create larger rents that in turn attract smaller exporters. This explanation, however, would imply that there is no barrier to entry in the agro-food sector.

The policy implications of these results are of significant interest. As EU foodstuff distributors show growing concerns for food safety, developing countries' access to EU markets is increasingly constrained by stringent sanitary requirements that are costly to implement.

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APPENDIX: DECOMPOSITION OF THE THEIL INDEX

Each year, the sample of EU suppliers can be divided into two groups. Group 1 (G_1) is composed of active suppliers (those actually exporting that year), numbering $n_{kt}^1 = n_{kt}^{EU}$. Potential exporters who do not actually send any shipment to the EU that year are in group 0 (G_0), numbering $n_k^0 = n_k - n_{kt}^{EU}$. We can decompose the Theil index into these two groups (respectively T_{kt}^0, and T_{kt}^1) and compute the Theil index between these groups and within them (respectively T_{kt}^B and T_{kt}^W).

The between-groups component of the Theil index is given by:

$$T_{kt}^B = \sum_{j=0,1} \frac{n_{kt}^j}{n_k} \frac{\mu_{kt}^j}{\mu_{kt}} \, ln\left(\frac{\mu_{kt}^j}{\mu_{kt}}\right)$$

It is a weighted average of terms involving only group means (relative to the population mean).

By L'Hôpital's rule: $\lim_{\mu_{kt}^0 \to 0}\left[\frac{\mu_{kt}^0}{\mu_{kt}} \, ln\left(\frac{\mu_{kt}^0}{\mu_{kt}}\right)\right] = 0$, so that:

$$T_{kt}^B = \frac{n_{kt}^1}{n_k} \frac{\mu_{kt}^1}{\mu_{kt}} \, ln\left(\frac{\mu_{kt}^1}{\mu_{kt}}\right)$$

The mean exports of active suppliers is $\mu_{kt}^1 = \frac{1}{n_{kt}^1}\sum_{c \in G_1} x_{kt}^c$, while the mean exports on all (potential) exporters is $\mu_{kt} = \frac{1}{n_k}\sum_{c=1}^{n_k} x_{kt}^c$ and by construction, $\sum_{c \in G_1} x_{kt}^c = \sum_{c=1}^{n_k} x_{kt}^c$, it follows that:

$$T_{kt}^B = ln\left(\frac{n_k}{n_{kt}^{EU}}\right)$$

The changes in the between-groups component of the Theil index trace exactly the percentage changes in the extensive margin defined as the number of active suppliers, as the set of potential exporters, n_k is time invariant:

$$\Delta T_{kt}^B = T_{kt}^B - T_{kt-1}^B = -\Delta \ln n_{kt}^{EU}$$

The within-group Theil index is defined as:

$$T_{kt}^W = \sum_{j=0,1} \frac{n_{kt}^j}{n_k} \frac{\mu_{kt}^j}{\mu_{kt}} T_{kt}^j$$

The Theil index is zero when all individuals have equal shares, hence $T_{kt}^1 = 1$. For active suppliers:

$$T_{kt}^1 = \frac{1}{n_{kt}^1} \sum_{c=1}^{n_k} \frac{x_k^c}{\mu_{kt}^1} \, ln\left(\frac{x_k^c}{\mu_{kt}^1}\right)$$

It reduces to:

$$T_{kt}^W = \frac{n_{kt}^{EU}}{n_k} \frac{\mu_{kt}^{EU}}{\mu_{kt}} T_{kt}^1$$

Table A6.1 *Descriptive statistics of main variables, 2001–2005*

Variable	Obs	Mean	Std. Dev.	Min	Max
Theil overall index	8598	3.3	0.71	0.66	4.99
Theil within (intensive margin)	8608	0.96	0.67	0	3.27
Theil between (extensive margin)	8608	2.34	1.06	-1.39	4.99
No. of active suppliers	8608	12.01	12.52	1	96
No. of potential suppliers	8608	78.56	30.09	10	147
Sanitary Risk Index	8608	0.76	1.99	0	12.21

7

Do Better Standards Facilitate Exports? Evidence from China[1]

Axel Mangelsdorf, Alberto Portugal-Perez and John Wilson

7.1 Introduction

Food safety has been a major concern in China. In 2004, at least 13 infants were reported to die from consumption of fake milk powder, and in 2008, six children were reported to die after consuming milk adulterated with melamine, anindustrial chemical (Gale and Buzby, 2009). Unsafe food is a serious threat for food sales to foreign markets. Producers risk losing substantial revenue and reputational damage when unsafe food is refused to enter foreign markets and food products are destroyed. Problems in meeting food safety standards give rise to health-related concerns and a loss in foreign consumers' confidence that can act to lower imports from China over time. According to the Asian Development Bank (2007), a weak regulatory infrastructure and low voluntary and mandatory standards are responsible for recurring incidences unsafe food production and the following import refusal. Therefore, complying with best practices, international food standards can be a powerful tool in addressing food safety problems. Existing research on Chinese standards in manufacturing sectors has shown that introducing new standards that are harmonized with international norms can be trade promoting (Mangelsdorf 2011). Applying international standards is in particular important for firms from developing countries with a reputation for low quality or unsafe products. Hudson and Jones (2003) argue that consumers in Western countries of associate product safety with per capita income of the exporting country. They argue that developing countries should apply more stringent standards to signal consumers that they produce high quality and safe agricultural and food products. In addition, standards application increase transparency of the product offered and reduces information asymmetries, especially in international transactions (Blind and Jungmittag, 2005). In this chapter, we show evidence on the impact of more stringent harmonized standards on Chinese exports food and agricultural products following the application of more stringent harmonized standards..

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1   This chapter draws on Mangelsdorf *et al* (2012).

A number of government agencies are involved in regulating food safety in China: the Ministry of Agriculture, the Administration of Quality Supervision, Inspection and Quarantine (AQSIQ), the Food and Drug Administration, the Ministry of Health, and the Administration for Industry and Commerce, and the Standardization Administration of the People's Republic of China (SAC). SAC is the agency responsible for approving and publishing domestic standards and adopting international standards including standards for food and agricultural products. Standardisation in SAC takes place in 450 national technical committees in which stakeholders from government agencies, industry and research organisations participate. SAC also represents Chinese interests in international organisations. China is actively involved in the Codex Alimentarius Commission (CAC), the organisation responsible for setting international standards for food products. For instance, SAC hosts the CAC sector committees for pesticide residues and food additives. Setting food safety standards is a general priority of the Chinese government. In the Eleventh Five-year Plan on the Development of Standardization, agriculture and food safety are named key areas for standardisation activities and the Chinese standardisation strategy encourages the adoption of international standards (Ping *et al*, 2010). Despite the participation in international standards setting bodies and the aim to adopt international standards, the number of Chinese standards based on international measures remains low compared to other countries. From the total number of standards recorded in our database, only 14% are based on international measures.

Does the introduction of mandatory and voluntary standards serves as a quality signalling instrument for Chinese exports? Are standards for Chinese agricultural products effective at reducing information asymmetries? The aim of this chapter is to attempt to answer these questions by assessing econometrically the impact of Chinese mandatory and voluntary standards on its exports of agricultural products. We draw on recent research by Mangelsdorf *et al* (2012) using a new database of Chinese food standards for seven groups of agricultural products: meat, fish, vegetables, cereals, milk, tea and sugar.

Our focus is on standards implemented by the exporting country for its produced goods. The new database allows differentiating between mandatory and voluntary standards. In addition, each type of standard can be identified as being harmonised to international norms or being a 'purely' domestic standard.

A collapsed gravity model was used to examine the impact of food standards in China on Chinese agricultural exports. Estimates confirm the export-promoting and quality signaling effect of standards. This is particularly true in regard to mandatory standards. In particular, the analysis confirms the positive impact of standards harmonisation. The impact of an additional standard that is based on international measures, we find, has a larger impact than the marginal impact of purely Chinese domestic standards.

The results discussed in this chpater provide new evidence to support the conclusion that the application of standards in general and international standards in particular leads to a positive trade effect of the exporting country.

The remainder of this chapter is structured as follows. In the next section, we screen the literature on the trade effects of standards in general and for China in particular. We present our empirical strategy, our data and descriptive statistics in Section 7.3. We present the empirical analysis by Mangelsdorf *et al* (2012) and present the effects of standards and regulations in Section 7.4. Finally, we summarise the results and conclude with some policy implications and recommendations in the last section.

7.2 LITERATURE REVIEW

7.2.1 Standards and trade

Standards can be differentiated by the freedom of choice regarding compliance (Henson, 2004). Mandatory standards -- also called technical regulations in the Agreement on Technical Barriers to Trade of the World Trade Organization -- are set by public regulators and compliance is obligatory. Voluntary standards are set by national standards development organisations such as Standardization Administration of the People's Republic of China (SAC) or by international organizations such as the International Organization for Standardization (ISO). Standardization is a formal process that involves multiple stakeholders such as industry and trade association or consumer organisations.

The literature on standards and trade differentiates the impact of standards set in the importing countries from standards set in the exporting country. The former argue that standards in the importing country can act as a barrier to trade. Developing countries are concerned that domestic standards in importing countries – especially in developed countries – increase the cost of compliance and restrict or even prevent market access (Henson and Jaffe, 2008). Empirical studies show that the costs of compliance can be significant. Otsuki *et al* (2001), for instance, use a gravity model to show that stringent standards for maximum allowable contamination in fruit and nuts imposed in the European Union led to significant export losses for African exporters. At the firm level, Maskus *et al* (2004) show that producers from developing countries face substantial investment costs in order to adapt their production processes in compliance with standards in export markets. International trade agreements encourage harmonisation of standards across countries. Evidence on the trade increasing effect of international harmonisation is provided, for instance, by Wilson *et al* (2003) for beef products. The authors find empirical evidence that if standards were harmonised according to Codex Alimentarius standards, international trade value would rise by more than 50% compared to the non-harmonised scenario and developing countries would benefit from harmonisation of standards. Portugal-Perez *et al* (2010) provide similar evidence for electronic products. Regarding the literature on the impact of standards in the exporting country, most studies indicate a positive trade effect for the exporting country. By providing information on safety levels and signalling quality, standards can

help to overcome incomplete or asymmetric information between producers and consumers (Leland, 1979).

7.2.2 *Standards and trade in China*

The literature on trade effects of standards in China largely focuses on standards in countries importing Chinese products. For instance, Chen *et al* (2008) examines in a gravity model the impact of maximum residual standards imposed by importing countries on Chinese exports for vegetables and aquatic products. The author finds significant negative effects for safety standards. Yue *et al* (2010) analyse the impact of maximum pesticide residue standards for tea imposed by the European Union. The authors find that the introduction of the stringent EU standard significantly decreases exports from developing countries including China. They also argue that the WTO should push the EU to harmonise their standards for tea with international Codex Alimentarius standards. Song and Chen (2010) differentiate the impact of food regulations in short- and long-term effects. In the short term, regulations in foreign countries, proxied as WTO SPS notifications, have a negative effect on Chinese agriculture exports but the long-run effect is positive. Chinese exporters can comply with foreign regulations in the long run because they significantly invest in new testing equipment, training and use voluntary standards to meet certification requirements in order to stay competitive in the world market. Bai *et al* (2007) as well as Jin *et al* (2008) confirm that Chinese food producers increasingly make use of voluntary standards. Based on surveys of Chinese firms, the authors find that the incentives to use voluntary standards and apply for certifications are to improve product quality and safety and access to the foreign market. In the next section, we briefly introduce the institutional background on standardisation in China.

7.3   EMPIRICAL MODEL AND RESULTS

7.3.1 *Empirical strategy*

In this section, we present the empirical model used to estimate the impact of voluntary and mandatory standards on China's exports. The data allows differentiating between standards that are based on international norms and purely Chinese domestic standards. Our data covers standards for seven product groups: meat (HS-02), fish (HS-03), vegetables (HS-07), cereals (HS-10)), milk (HS-0401 and HS 0402), tea (HS-0902), and sugar (HS-1701 and HS 1702). Chinese exports in these product groups amount to about 40% of China's total exports in agricultural goods. These products are a frequent target of strict food standards and heavy regulation (see, for instance, Chen and Findlay, 2008). We base our empirical model in the micro-founded gravity model widely used in the trade literature and adapt it to Chinese standardisation in food products categories (Anderson and van Wincoop, 2003).
   More specifically, we estimate the equation:

$$\ln X_{ikt} = \beta_0 + \beta_1 StMD_{kt} + \beta_2 StMI_{kt} + \beta_3 StVD_{kt} + \beta_4 StVI_{kt} + \beta_5 Tariff_{ikt}$$
$$+ \beta_6 \ln Cons_{ikt} + \delta_{it} + \delta_{kt} + \delta_{ik} + \varepsilon_{ikt}$$

where X_{ikt} is the value of Chinese exports of product k to country i in year t in dollars; $StMD_{kt}$ and $StMI_{kt}$ are the stocks of mandatory purely domestic (non-harmonised) and international harmonised standards for product k that are active in year t; $StVD_{kt}$ and $StVI_{kt}$ are the stocks of voluntary domestic (non-harmonised) and international harmonised standards for product k in year t; $Tariff_{ikt}$ is the tariff imposed by country i on Chinese exports of product k in year t; $\ln Cons_{ikt}$ is the domestic consumption of product k in country i in year t, measured in dollars;[2] δ_{it}, δ_{kt} and δ_{ik} are interaction terms of importer-year dummies, product-year dummies and importer-product dummies; and ε_{ikt} is an error term. Three dummy interactions terms are incorporated in the baseline model. The interaction of importer and product dummies (δ_{ik}) control for invariable characteristics specific to the food sector in a given importer. Importer–year fixed effects (δ_{it}) control for shocks experienced by an importer a given year, such as political shocks. Product–year fixed effects (δ_{kt}) control for shocks specific to world markets of a product in a given year.[3] All variables are included in logarithmic form except the standards variables. Therefore, the coefficient of the standard variables can be interpreted as the impact on exports growth of an additional standard.

As noted before, previous empirical evidence shows that a reduction in the number of standards in an exporting country has a positive effect on exports, as information and signalling benefits are bigger than compliance costs. Indeed, standards in the exporting country reduce information asymmetries regarding quality and safety levels of food products between producers in China and consumers in importing countries. The existence of exporter standards increases exports compared to a situation where no standards exist (Moenius, 2006). Therefore, we expect positive signs in the coefficients of Chinese standards variables, with *a priori*, a larger impact of mandatory standards compared to voluntary standards as compliance with the latter is optional. International standards applied by Chinese producers are expected to have a positive effect for Chinese exports for two reasons. First, compliance with international standards can be a strong signal that Chinese producers meet safety and quality criteria that are widely recognised. Second, when exporting countries use international standards they share the same standards with the regulatory requirements in other countries and there are no additional compliance costs.

Compared to national standards, the informational and signalling benefits of complying with international standards are expected to be larger than complying

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2   We computed the consumption of product k in country i and year t as $C_{ikt} = (S_{ikt} + M_{ikt} - X_{ikt})P_{ikt}$, where S_{ikt} is the domestic supply of product k in country i in year t in tonnes, M_{ikt} (X_{ikt}) stands for imports (exports) of product k in country i in year t in tonnes, and P_{ikt} is the import price of product k in country i in year t in dollars.
3   A similar strategy of incorporating dummy interaction terms to control for unobserved effects is adopted by Harding and Javorcik (2011) and Ferro *et al* (2011).

with national standards. The coefficient of tariffs is expected to be negative. As a proxy of demand for each product group in each importing country, we include the importing countries' total domestic consumption and its sign is expected to be positive as higher domestic demand is expected to increase the demand for imports from China. To control for unobserved characteristics specific to an importer, such as distance to China or historical linkages, and specific to a product, we include fixed effects for importers and products.

7.3.2 Data sources

Export volumes are compiled from the COMTRADE database at the Harmonized System (HS 1992), whereas tariffs are compiled from the TRAINS database. Data to construct consumption variables are drawn from the Food and Agriculture Organization of the United Nations' statistical database FAOSTAT.[4] Data on mandatory and voluntary standards are compiled from the Standards Administration of the Peoples Republic of China (SAC), the Chinese official national standards body.[5] Chinese standards developed in SAC are accessible through an online database, the SAC National Standards Query. To ensure reliability and completeness, the standards have been cross checked with the 'Chinese Bulletin of Standards' published by AQSIQ and the German-Chinese Standards Portal. The Chinese National Standards Query provides information on the date the standard came into effect, and the date the standard has been withdrawn or replaced by a newer version. Each standard is classified according to the International Classification of Standards (ICS) nomenclature, which allows matching standards to trade data. The database allows differentiation between Chinese standards harmonised to international norms such as Codex Alimentarius and standards that are unique to China.[6] A concordance table between the seven-digit ICS classes and the trade data in HS codes can be found in Table 6A.1 in the Appendix. The database allows us to construct four different standards variables according to two criteria: (i) mandatory versus voluntary standards, and (ii) domestic versus international harmonised standards. Table 7.1 provides two examples to illustrate the different types of standards. The first example, the standard GB 14939-1994 'Hygienic standard for canned fish' is a mandatory performance standard. It is equivalent with the international Codex Standard 70. The second example, GB/T 22388-2008 is a voluntary testing standard to determine the content of melamine which has no international equivalent.

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4   *http://faostat.fao.org/*
5   SAC obtained legal recognition by the Chinese government through the Standardization Law of the People's Republic of China from 1988 (source: ISO).
6   SAC develops mandatory and voluntary standards. The prefix 'GB' indicates mandatory standardsand voluntary standards are prefixed 'GB/T'.

Table 7.1 *Examples of Chinese Standards*

Product Group	Standard	Standard Name	Adopted International Standard	Application Degree
Fish	GB 14939-1994	Hygienic standard for canned fish	CAC 70:1995	NEQ
Tea	GB/T 23376-2009	Determination of pesticides residues in tea - GC/MS method	-	-

Source: Authors' calculations based on SAC National Standards Query

7.3.3 *Descriptive statistics*

We construct a frequency measure for the four types of standards, which counts the number of standards directly linked to agricultural commodities[7] Frequency measures or count variables are often used to measure the impact of standards and regulation on trade. The advantage of frequency measure is that they are relatively easy to construct. One disadvantage is, however, that they may suffer from the so-called 'mixed bag' problem, which means that each standard to regulating food safety may differ in the level of stringency and have a different impact on trade. For instance, the 'hygienic-performance' standards might have a larger effect on exports than the 'testing standards', or vice versa. Due to the absence of variables indicating the complexity or stringency of the standards we believe that the number of standards represents a good proxy for the level of regulatory intensity in China and has been widely used in the literature estimating the impact of standards on trade (see, for instance, Swann *et al*, 1996; Blind and Jungmittag, 2005; Moenius, 2006; Portugal-Perez *et al*, 2010; and Otsuki *et al,* 2001). Figure 7.1 depicts the evolution of the number of standards in the Chinese food products studied here. The dotted lines in Figure 7.1 reveal that the share of mandatory harmonised international standards decreased from 10.4% in 1992 to 8.9% in 2008 whereas the share of voluntary international harmonised standards increased from 9.8% in 1992 to 15.0% in 2008. The transition from mandatory standards to voluntary standards and the increased adoption of harmonised international standards reflects China's commitment to fulfil the obligations under the WTO TBT and SPS Agreement.[8]

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7   Further details on the evolution of Chinese standards are discussed in Mangelsdorf *et al* (2012)
8   In November 2003, China stated in the WTO Committee on Sanitary and Phytosanitary Measures that 'The Government of China attaches great importance to the principle that SPS measures shall be based on international standards. In December 2001, AQSIQ issued "Regulatory Measures Governing the Adoption of International Standards" (AQSIQ Decree No. 10), which stipulates clearly the principles and procedures for adopting international standards' (G/SPS/GEN 452 from November 2003).

Figure 7.1 *Stock of voluntary and mandatory Chinese food standards*

— Mandatory Standards
— Voluntary Standards
- - Percentage of harmonized mandatory standards (right hand scale)
· · · Percentage of harmonized voluntary standards (right hand scale)
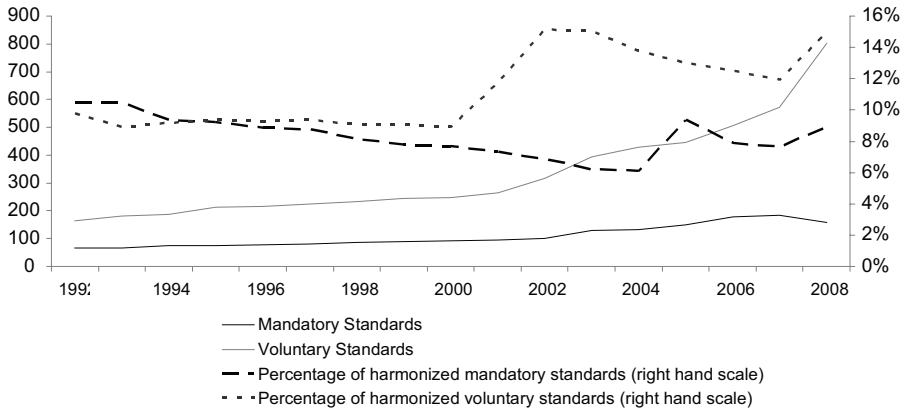
Regarding harmonisation differences between product groups, Table 7.2 shows in 4-year intervals the percentage of Chinese standards that are unique to the country and not harmonised to international measures. The percentage of Chinese domestic standards is decreasing over time or – in other words – China increasingly bases its standards on international standards.

Table 7.2 *Percentage of Chinese domestic standards 1992–2008*

Product	1992	1996	2000	2004	2008
Meat	90.6	91.4	92.2	92.1	88.9
Fish	100.0	100.0	100.0	100.0	97.0
Vegetables	88.9	84.6	83.7	86.9	83.0
Cereals	100.0	98.9	99.0	98.6	88.7
Milk	73.6	75.4	75.4	75.0	80.5
Tea	100.0	100.0	100.0	75.0	74.3
Sugar	100.0	100.0	100.0	100.0	86.7

Source: Authors' calculations based on SAC National Standards Query.

7.3.4 Results

The estimation is carried out in a panel covering Chinese agricultural exports to 132 countries over the period 1992–2008. Table 7.3 summarises descriptive statistics on the sample over which estimates are carried out. Notice that there are fewer observations for consumption and tariff, as data for these variables is sometimes not reported for some goods in an importing country. Yet, coefficient estimates for standards do not change when these variables are excluded from regressions, as shown below.

Table 7.3   *Chinese agricultural exports: descriptive statistics*

Model variable	Observations	Mean	Standard deviation
$\ln X_{ikt}$	7646	5.98	2.99
$StMI_{kt}$	7646	1.12	1.50
$StMD_{kt}$	7646	14.42	9.36
$StVI_{kt}$	7646	4.77	6.22
$StVD_{kt}$	7646	42.32	37.03
$\ln CONS_{ikt}$	6848	19.82	2.88
$Tariff_{ikt}$	6089	0.13	0.16

Source: Authors' calculations based on SAC National Standards Query.

Table 7.4 reports OLS estimates for our specification. Column 1 reports estimates from the baseline model (Equation 1). All coefficients have the expected signs. Regarding the relative impact of standards, internationally harmonised mandatory standards seem to have the largest impact on Chinese exports. As consumption and tariff data have missing observations for some sectors in some countries, we exclude these variables from the baseline specification. As shown in column 2, estimates of standards coefficients do not change significantly to the omission of tariffs and consumption variables. In order to control for characteristics specific to products, importer, and years, we include the interaction of product-year dummies, importer-product dummies and importer-year dummies. Columns 1 and 2 include all three interaction variables and in columns 3 and 4 we only include the interaction of product-year dummies and importer-product dummies. The coefficient for mandatory internationally harmonised standards has the expected positive sign in all models. Voluntary internationally harmonised standards also have the expected positive sign but the coefficient is insignificant when excluding consumption and tariffs. Regarding the relative impact, internationally harmonised mandatory standards seem to have the largest impact on Chinese exports. The impact of domestic standards is less clear. Mandatory domestic standards exert a negative influence on exports in columns 2 to 4 but have no significant effect in column 1. Similarly, voluntary internationally harmonised standards are positively correlated with exports in column 3 but have no impact on exports in the other models. Thus, standards exert a positive impact on exports when they are harmonised with international norms. Estimates for other products are reported in Table 6A.2 in the Appendix..

Table 7.4 *Baseline results of OLS estimates*

Model variable		1 Base	2 Base	3 Base	4 Base
Mandatory international standards	$StMI_{kt}$	1.538	1.480	0.497	1.214
		[0.203]***	[0.217]***	[0.025]***	[0.462]**
Mandatory domestic standards	$StMD_{kt}$	-0.047	-0.310	-0.06	-0.112
		[0.040]	[0.103]**	[0.005]***	[0.038]**
Voluntary international standards	$StVI_{kt}$	0.192	0.115	0.024	0.006
		[0.056]**	[0.121]	[0.004]***	[0.021]
Voluntary domestic standards	$StVD_{kt}$	0.002	0.035	0.003	0.001
		[0.013]	[0.027]	[0.001]**	[0.004]
Consumption (log)	$lnCons_{kt}$	0.122		0.127	
		[0.046]**		[0.022]***	
Tariff	$Tariff_{ikt}$	0.083		-2.585	
		[0.655]		[1.408]	
Constant		-0.847	6.862	2.834	2.661
		[0.630]	[1.268]***	[0.308]***	[1.391]
Observations		5555	5278	5555	7646
R^2		0.85	0.86	075	0.69
Importer-product dummies		Yes	Yes	Yes	Yes
Product-year dummies		Yes	Yes	Yes	Yes
Importer-year dummies		Yes	Yes	No	No

Notes: The dependent variables are bilateral exports. Robust standard errors are clustered by product groups and are reported in brackets. The asterisks represent the level of significance: * significant at 10%; ** significant at 5%; *** significant at 1%.

We also tested the robustness of our regression results to different specifications. All regressions with robustness tests are reported in Mangelsdorf *et al.* (2012), we present here a brief discussion. First, we aimed at measuring whether the effect of standards is different when the importer is a high-income country and constrain the sample to include only high-income importers. The results are qualitatively similar to the baseline model. The impact of mandatory standards is positive and the effect of voluntary harmonised standards. Domestic mandatory standards exert a negative influence on exports and the effect of voluntary standards is positive but smaller than the effect of harmonised standards. The results suggest that high-income importers seem to value harmonised standards – mandatory in particular – as more important than domestic standards. Second, standardisation could also be influenced by the volume of exports in a particular sector through lobbying from exports, which may lead to the possible endogeneity of our standards measure due to reverse causality. However, in the case of Chinese standards, it is unlikely that they are set in response to unexpected surges in food imports demand from a single country in a single year, given the complexity and the high number of Chinese agencies involved in making standards. Moreover, generating standards is a time-consuming process. It requires the coordination

of preference from various interests groups. In international standardisation, the time between the first preposition of a new standard and the final publication can take more than 5 years (Blind and Jungmittag, 2005). In China, the average time for generating a new standard is 4.7 years (Ping *et al*, 2010). Yet, as another robustness check, we include alternately in our regressions two-year and three-year lagged standards. Qualitatively, results are the same; standards exert a positive impact on export with the highest effect for mandatory harmonised standards.

7.5   CONCLUSION

This chapter presented empirical evidence on the impact of Chinese standards for export of agricultural goods. Whereas past literature on the trade impact of standards for developing countries has focused on the impact of standards and standards harmonisation in the importing (developed) country, we argue that the effect of standards application in the exporting country has to be taken into account. In particular, Mangelsdorf *et al* (2012) show that standards harmonisation in China has a positive effect for China's export success. The results of our estimates for seven product categories can be summarised as follows. First, based on new data, results confirm the trade enhancing potential of standards outlined in previous studies (see, for instance, Swann, 2010). A larger stock of standards in China is associated with expanding exports. Second, we can show that the push effect of standards is larger when they are based on international standards such as Codex Alimentarius standards. Estimates suggests that one additional internationally harmonised standard in China is associated with an increase in agricultural exports ranging between 0.5% and 1.54%. Third, the trade effects of standards are different for voluntary and mandatory standards. The impact of the mandatory standards is positive and statistically significant for both purely domestic and international harmonised standards. The trade impact for voluntary standards is less clear. Although voluntary domestic standards have a positive impact on Chinese exports in most model specifications, the impact is either smaller or statistically not significant compared to mandatory standards. This may be due to the fact that mandatory regulations affect many more aspects of food products along production and supply chains, among other factors. We explain the positive impact of standards in general with the information asymmetry reducing effect. Standards – whether voluntary or mandatory – increase the transparency of the food products by providing information such as maximum levels of pesticides to consumers. Obviously, standards reduce information asymmetries between Chinese producers and foreign consumers. The trade effect of international harmonised standards is larger than the impact of purely domestic standards and this is particularly true for international harmonised mandatory standards. This can be explained with the signalling effect of standards regarding quality and food safety. Producers have an incentive to apply standards as they are a signal for the producers' investment in high-quality products. In the case of Chinese food products, international mandatory

standards seem to have a larger signalling effect than purely domestic standards. Foreign customers seem to acknowledge the producers' decision to invest in compliance with international standards.

We conclude the chapter with the following policy suggestions that could also be relevant for other emerging economies. First, results show a larger trade impact of harmonised standards compared to purely domestic standards. The harmonization of Chinese domestic standards with international standards may be lagging behind. Compared to countries in the European Union, for instance, the percentage of international standards in China's standards portfolio is relatively low. Chinese authorities should accelerate the adoption process to meet the requirements of internationally accepted food safety standards. In case international standards are deemed to be too stringent for adoption in China, Chinese authorities might consider negotiating Mutual Recognition Agreements with other authorities from export destinations. Mutual recognition can reduce the risk of border rejection and also avoid unnecessary duplicative testing of food and agricultural products. Negotiating Mutual Recognition Agreements might also be the first step of further cooperation between authorities of trading partners. Second, it is not enough to adopt international harmonized standards but it is also important to implement the necessary infrastructure to enforce standards. Therefore, China should also invest capacity building measures related to food safety supervision such as development of testing laboratories and personnel for market surveillance. Third, China should continue to expand participation in international standards-setting organisations such as Codex Alimentarius Commission. Participation in international organisations allows Chinese stakeholders to include specific national preference in international norms and may facilitate the adoption at the national level. Fourth, under the WTO TBT and SPS Agreement member countries should use international standards where they exist but are free to set domestic standards to fulfil regulatory objectives such as food safety. When developing domestic standards, Chinese authorities can leverage incentives in WTO obligations to expand trade – to the benefit of both China and global consumers. Existing research suggest that developing countries can benefit from the adoption of international standards to access foreign markets. Adoption of international standards can be facilitated when developing countries actively participate in committees of international standards-setting organisations. As a result, countries can influence the content of the standards used by their trading partners. Although technical committee work is related to participation costs, participation decreases the risk of adopting standards that are too sophisticated or excessively costly for domestic producers.

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8

Standards Harmonisation and South–South Trade

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8.1 Introduction

As part of the modernisation of its regulatory environment, Mauritius has recently been considering the adoption of a technical regulation on toxic chemicals used in paints that would closely resemble EU regulations. The benefit of harmonising technical regulations with the EU is that Mauritius's paint manufacturers could have their products distributed in EU supermarkets, including in the nearby Reunion. However, production costs would increase,[1] and the increase would, in all likelihood, price them out of East and South African markets where chemical residues in paints are not an issue. Would enhanced access to Northern markets compensate foreseeable losses on Southern ones?

In a different setting, Michael Jensen and John Keyser (2011) argue, in their contribution to the present volume, that a recent decision by the East African Community (EAC) to harmonise Member States' technical regulations for dairy products with international ones is likely to stifle intra-regional trade in dairy products, as only the very largest operators are capable of meeting the stringent international standards. In addition, they argue that the approach does not make much sense given local consumption habits (no one consumes the milk without first boiling it).

These two examples raise a common question – is there such a thing as 'premature harmonisation' of technical regulations by developing countries on stringent Northern standards? The price to pay for such harmonisation is – beyond testing and certification procedures that can be difficult to implement in developing countries – higher production costs and ensuing losses of export potential on low-income markets where the types of externalities addressed by technical regulations are not primary concerns. In a world where South–South trade grows faster than North–South (Gourdon, 2007), this may be a high price to pay.

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1 In an interview with the authors, a local producer estimated the cost increase at 2% to 40% of baseline average costs, depending on the product.

The effect of standards on trade has been the object of a voluminous literature, following several strands. A first strand has focused on how Northern standards (technical regulations and private standards) affect developing-country exports, in particular in the agri-food sector. Paarlberg and Lee (1998), Otsuki *et al* (2001), Wilson and Otsuki (2004), Maskus *et al* (2005), Disdier *et al* (2008), to name but a few, all found that food safety regulations set by Northern countries had a depressing effect on Southern exports of foodstuffs. Beyond the particular case of food standards, Essaji (2008) found that US technical regulations significantly affected both the pattern of developing country exports and the probability of export to the US. Czubala *et al* (2007) further showed that the trade-inhibiting effect of Northern (EU) standards was worse when they were not harmonised with international ones.

Some recent papers have taken a more nuanced view. From a theoretical point of view, Jaud (2011) shows that the relationship between the stringency of standards and the volume of imports is a complex and potentially non-monotone one when selection and reputation effects are properly accounted for. Empirically, some estimates of compliance costs suggest that they may not be all that high. Two World Bank studies (Aloui and Kenny, 2004, and Cato *et al*, 2005) estimated, in two very different contexts – Moroccan tomatoes and Nicaraguan shrimps respectively – SPS compliance costs at around 3% of total costs. Other World Bank studies have highlighted success stories of producer adaptation to food standards, including Thai and Kenyan horticulture (Jaffee, 2003; World Bank, 2005), Thai and Nicaraguan Shrimp (World Bank 2005), or Indian spices (Jaffee, 2005). Minten *et al* (2009) and Maertens and Swinnen (2006) provided similar accounts for vegetable exports from Madagascar and Senegal respectively. Using a sector-level gravity equation, Moenius (2004) found that industrial-country standards raised their imports rather than reducing them. All in all, both theory and empirics are somewhat ambiguous on how high is the barrier created by Northern SPS standards for Southern exports.

Beyond design, a number of recent papers have looked at enforcement, with results suggesting trade-inhibiting effects. Debaere (2010) analyses a cascade of events affecting Asian shrimp exports to Western countries, starting with EU enforcement, in 2001, of a zero-tolerance policy for antibiotics residues, followed by export deflection to the US market, where they were met by a devastating anti-dumping action. In this volume, Jouanjean, Maur and Shepherd show that the US FDA's enforcement of food-safety regulations at the US border is discretionary and at least partly based on reputation effects, as past alerts on one product imported from one country significantly raise the probability of subsequent alerts on the same product from neighbouring countries or on similar though distinct products.

A second strand has looked at how regional standards policies have affected intra-regional trade and market access for outsiders, although, as highlighted by Bourgeois *et al* (2007), relatively little attention has been given in the literature to the effect of standards liberalisation in the context of Regional Trade Agreements (RTAs). In an early contribution, Baldwin (2000) argued that mutual recognition

among developed countries could well lead to a two-tier international trade system with developing countries in the second tier. Empirically, in a paper already discussed, Moenius (2004) found that the count of shared standards among industrial countries significantly raised their trade. Looking at trade-diversion effects, Amurgo-Pacheco (2006) showed that MRAs harmed third-country exports irrespective of their level of development. Baller (2007) found that mutual recognition of product standards in the telecom-equipment and medical-device sectors as part of RTAs had strong effects on intra-bloc trade; harmonisation had insignificant effects on intra-bloc trade and on the exports of non-members if they were developing, although it had strong effects on OECD non-member exports. Overall, the effects were stronger at the extensive margin (the probability of positive exports). Chen and Mattoo (2008) showed that both mutual-recognition agreements (MRAs) between industrial countries, especially with rules of origin and, to a lesser extent, standards harmonisation, raised significantly the probability and volume of intra-bloc trade between developed countries, although trade with the rest of the world was reduced. MRAs without rules of origin raised trade both within member countries and with the rest of the world. In his contribution to this volume, Reyes finds, using firm-level data, that the harmonisation of EU electronics standards had a pro-competitive effect on US exporters (incumbents lost market share to entrants), but that, overall, developing-country exporters were hurt.

Finally, two papers have shown that provisions on technical barriers to trade (TBTs), which cover technical regulations and mandatory standards, are widespread in regional trade agreements. In a survey of 58 RTAs with TBT provisions, Piermartini and Budetta (2009) found more harmonisation for technical regulations and more mutual recognition for conformity-assessment procedures, the latter being typically preferred in US RTAs whereas the former was preferred in EU RTAs. Piermartini and Budetta conjectured that this might lock countries into RTAs, hampering multilateral trade liberalisation, but they did not formally test the conjecture. In a study of 28 regional agreements signed by the EU and the US, Horn *et al* (2009) found that all but two (both involving the US) had TBT provisions. Moreover, some of those provisions (5 for the EU and 11 for the US) were binding rather than mere recommendations. For instance, some of the EU's FTAs with Mediterranean countries, including the agreements with Morocco or Tunisia, *mandate* the harmonisation of the partner's regulations on the EU's 'acquis communautaire'.[2]

In this chapter, we explore empirically the conjecture laid out at the outset – namely, that Southern countries harmonising their standards with Northern ones may lock themselves in a bilateral relationship, at the expense of relations with other Southern countries. While the issue of standards harmonisation is, in practice, largely linked to North–South RTAs, our identification strategy

2   See European Community (EC)-Morocco FTA, Article 51; European Community (EC)-Tunisia FTA, Article 51; or EC-Palestinian Authority FTA, Article 40.

attempts to disentangle the effect of harmonisation from that of preferential trade using RTAs with and without harmonisation.

We use a standard, theory-based panel gravity framework. In accordance with our conjecture, we find that North–South RTAs hurt South–South trade. Our surprisingly strong results suggest that the harmonisation of technical regulations in North–South RTAs may well have the – presumably unintended – effect of reinforcing hub-and-spoke patterns in world trade and even marginalising Southern partners from the world economy.

8.2 DATA AND EMPIRICAL SPECIFICATION

Our data combines Piermartini and Budetta's annotated list of RTAs with a panel of aggregate bilateral trade over 1990–2006 from the CEPII's BACI database.[3] Figure 8.1 shows the number of North–South RTAs, broken down according to the harmonisation clauses they include (or not), in three following years: 1990, 1999 and 2006 (see Appendix Table A8.1 for detailed statistics). The number of RTAs expanded from 4 in 1990 to 43 in 2006, covering today 19.5% of Northern imports from Southern countries. Most of the expansion in the number of North–South RTAs is accounted for by agreements with some sort of harmonisation clause, either for technical regulations (TR) or for conformity-assessment procedures (CAP). Interestingly, although the figure shows that the number of agreements promoting the use of international standards (such as ISO) for technical regulations has shot up from 2 to 12, but their share in Northern imports from the South has slightly declined from 12.1% to 11.8%.[4]

Figure 8.1 *Number of North–South RTAs, by type of harmonisation clause*
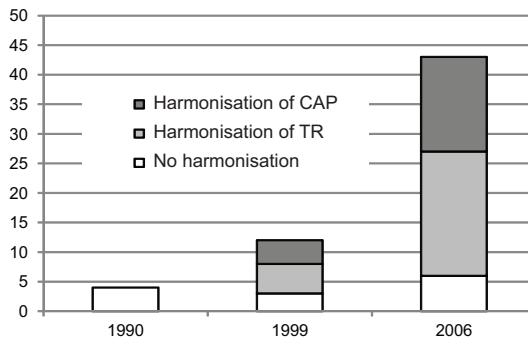
Notes: CAP: Conformity-assessment procedures; TR: Technical regulations.

Source: Based on Piermartini and Budetta (2009).

3   See *http://www.cepii.fr/anglaisgraph/bdd/baci.htm*. This database uses original procedures to harmonise the United Nations COMTRADE data (evaluation of the quality of country declarations to average mirror flows, evaluation of cost, insurance and freight rates to reconcile import and export declarations). See Gaulier and Zignago (2010).

4   The figure for the share of Northern imports refers to all trade between trading partners; not trade eligible for non-zero tariff preferences (for instance, zero-MFN tariff lines are included in covered trade).

The list of 43 RTAs considered in our exercise is provided in the appendix. It follows the format of Piermartini and Budetta (2009), updating it with some recent agreements. We mark bilateral South–South trade flows – on which we focus in this chapter – according to whether they can be, directly or indirectly, affected by North–South RTAs. For this, we define a vector of dummy variables which we interact in order to get a string of binary codes for all possible configurations.

That is, let i and j be two Southern countries, and consider a bilateral trade flow where i is the exporter and j is the importer.

$$\delta_0 = \begin{cases} 1 & \text{if } i \text{ and } j \text{ are partners in the same (South-South) RTA} \\ 0 & \text{otherwise} \end{cases} \tag{1}$$

$$\delta_1 = \begin{cases} 1 & \text{if either } i \text{ or } j \text{ has an RTA with a Northern partner} \\ 0 & \text{otherwise} \end{cases} \tag{2}$$

We further define

$$\delta_2 = \begin{cases} 1 & \text{if only } i \text{ or only } j \text{ has an RTA with a Northern partner} \\ 0 & \text{otherwise} \end{cases} \tag{3}$$

$$\delta_3 = \begin{cases} 1 & \text{if only } i \text{ has an RTA with a Northern partner} \\ 0 & \text{otherwise} \end{cases} \tag{4}$$

$$\delta_4 = \begin{cases} 1 & \text{if only } j \text{ has an RTA with a Northern partner} \\ 0 & \text{otherwise} \end{cases} \tag{5}$$

The ensuing logical structure is shown in Figure 8.2. In order to exhaust cases of interest, the figure shows, in columns, whether any given South–South bilateral trade flow is governed by a South–South (SS) RTA. In lines, the figure breaks down cases depending on whether any or both partners may also belong to a North–South (NS) RTA.

The first column indexes regression equations. For each of these regression equations, the second column lists dummy variables appearing on the right-hand side (as explanatory variables), and the next two columns state conditions used to characterise North–South (NS) RTAs to which any partner may belong.

Equation (1) distinguishes only between cases where a SS RTA exists and cases where none exists. Conditional on either the existence or non-existence of a SS RTA, Equation (2) distinguishes between cases where either i (the exporter) or j (the importer) belongs to a NS RTA, from cases where neither belongs to any. Similarly, Equation (3) distinguishes between flows whether only i or only j belongs to a NS RTA, from cases where neither i nor j belong to any, or else both belong to some. Finally, Equations (4), (5) and (6) distinguish between cases where (i) only i (the exporter) belongs to a NS RTA, (ii) only j (the importer) belongs. The figure shows the resulting strings of binary codes for δ_0 (Equation

1), δ_0 and δ_1 (Equation 2), δ_0 and δ_2 (Equation 3), and δ_0, δ_3 and δ_4 (Equations 4, 5 and 6).

Figure 8.2 *RTA configurations*

Equation	Dummies	First condition	Second condition	SS RTA yes	SS RTA no
(1)	δ_0			1	0
(2)	δ_0, δ_1	NS RTA for i or j — yes		11	01
		no		10	00
(3)	δ_0, δ_2	NS RTA for only i or only j — yes		11	01
		no		10	00
(4), (5), (6)	$\delta_0, \delta_3, \delta_4$	NS RTA for only i — yes		110,111	010,011
		no	NS RTA for only j — yes	101	010
			no	100	000

Note: Binary-code strings in the boxes to the right represent the values of the dummies included in the equation whose number appears in the first column. Thus, in Equation (1), '1' means $\delta_0 = 1$; in Equation (2), '11' means $\delta_0 = 1$, $\delta_1 = 1$; in Equations (4), (5) or (6), '110,111' means either $\delta_0 = 1$, $\delta_3 = 1$, $\delta_4 = 0$ or $\delta_0 = 1$, $\delta_3 = 1$, $\delta_4 = 1$; and so on.

NS RTAs are further subdivided by the harmonisation clauses they include or not. We focus on TBT provisions. Conditional on either $\delta_3 = 1$ or $\delta_4 = 1$ (NS RTA for either the exporter or the importer respectively) we define the following additional dummies:

$$\delta_5 = \begin{cases} 1 & \text{if technical regulations and harmonised in } i\text{'s NS RTA} \\ 0 & \text{otherwise} \end{cases} \tag{6}$$

and

$$\delta_6 = \begin{cases} 1 & \text{if technical regulations and harmonised in } j\text{'s NS RTA} \\ 0 & \text{otherwise} \end{cases} \tag{7}$$

We define similar dummies for the harmonisation of conformity-assessment procedures.

Thus, we distinguish between cases where the signatory is the importing country and cases where it is the exporting country, as the story is potentially different. In the case of a NS RTA signed by the exporting country, the potential effect is a cost-raising one if domestic producers are induced to adopt costlier production processes on all their lines of production, say because of indivisibilities. The expected effect is then a loss of competitive positions on the Southern partner's market, reflected in a reduced export flow. In that case the harmonisation acts like a *de facto* production standard for the Southern country. In the case of a NS RTA signed by the importing country, the potential effect is a trade barrier one if products from the Southern partner are no longer in compliance when technical regulations are harmonised with the North. The expected effect is then a reduction in imports from the Southern partner. In both cases, the conjecture is a reduction in the South–South bilateral trade flow.

We use a standard panel gravity equation with importer, exporter and time fixed effects (see Feenstra, 2004; Baldwin and Taglioni, 2006). The dependent variable is the FOB value of total bilateral imports from country i to country j. GDPs are from the World Development Indicators database. Transport costs are proxied by the bilateral distance between trading partners, also from CEPII. We also add standard dummy variables measuring the ease of bilateral trade including common border, common language and a common colonial history.

Finally, our estimator is the zero-inflated negative binomial model (see Burger *et al*, 2009), which handles zero values and overdispersion.[5]

8.3   Results

Results are reported in Table 8.1. Coefficients on gravity variables have standard signs and magnitudes. Distance reduces trade, while contiguity, common language and past common coloniser raise it. The dummy variable controlling for the existence of a South–South RTA is positive and significant at the 1% level.

Columns (2)–(3) highlight a first trade-diversion effect, irrespective of harmonisation clauses: The signature by either the exporter or the importer of a RTA with a Northern partner tends to reduce its bilateral trade with other Southern countries, thus, in itself, reinforcing a hub-and-spoke pattern in world trade. Column (4) shows that this effect is stronger (larger in magnitude and more precisely estimated) when the importer is engaged with a Northern partner. Assuming a unit price elasticity of import demand, the ad valorem equivalent (AVE) is 22.1%.[6] That is, a Southern country signing an RTA with a Northern partner imposes a negative trade-diversion effect on its Southern partners equal to a 22.1% tariff, a very large effect.

Columns (5) and (6) confirm the paper's conjecture. When the exporter is engaged in an RTA with a Northern partner involving the harmonisation of technical regulations, the inhibiting effect on its bilateral trade with Southern partners is equivalent to a tariff at a whopping 35.0% under the maintained assumption of a unit elasticity. The harmonisation of conformity-assessment procedures has a similar effect (37.7%).

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5   Poisson and negative binomial models assume that all pairs of countries have a positive probability of trading, which may not be true for pairs of countries with scarce resources and wide bilateral distance. The zero-inflated model deals with this problem by assuming the existence of two latent groups within the population: (i) an 'always zero group' having an outcome of zero with a probability of one and a 'not always zero group' having a non-zero probability of having a positive count. Robustness tests using the Poisson estimator give very similar results. The approach is validated using over-dispersion tests and the Vuong statistic comparing zero-inflated and non-zero-inflated models.

6   The ad valorem equivalent is $\exp(-\beta/\varepsilon)-1$, where β is the estimated coefficient and ε the price elasticity of import demand (in algebraic form, ie negative). The average price elasticity of imports, over all goods and countries, is estimated by Kee *et al* (2008) at -3.12 at HS6 and -1.1 at ISIC3. As we are dealing with aggregate flows here, the lower value estimated by Kee *et al* at the more aggregate level (ISIC3) where substitution possibilities are reduced, is more plausible.

Table 8.1   *Regression results, South–South trade*

Dep. Var.: Bilateral imports between Southern countries
Estimator: Zero-inflated negative binomial

Equation	(1)	(2)	(3)	(4)	(5)	(6)
Gravity variables						
Ln GDP *i* (exporter)	0.15*	0.15*	0.15*	0.15*	0.16*	0.16*
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
Ln GDP *j* (importer)	0.37**	0.36**	0.36**	0.36**	0.36**	0.36**
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Ln distance	-1.36**	-1.36**	-1.36**	-1.36**	-1.36**	-1.36**
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Common border	0.94**	0.94**	0.94**	0.94**	0.94**	0.94**
	(0.10)	(0.10)	(0.10)	(0.10)	(0.10)	(0.10)
Common language	0.29**	0.29**	0.29**	0.29**	0.29**	0.29**
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
Past common coloniser	0.45**	0.45**	0.45**	0.45**	0.45**	0.45**
	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)
Agreements						
SS RTA	0.48**	0.48**	0.48**	0.48**	0.48**	0.48**
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
NS RTA for *i, j* or both		-0.21**				
		(0.04)				
NS RTA for either *i* or *j* but not both			-0.15**			
			(0.04)			
NS RTA for *i* (exporter) only				-0.10*	0.09	0.09
				(0.05)	(0.08)	(0.08)
NS RTA for *j* (importer) only				-0.20**	-0.16*	-0.19**
				(0.06)	(0.08)	(0.07)
Harmonisation clauses						
NS RTA w/TR harm. for *i* only					-0.30**	
					(0.08)	
NS RTA w/TR harm. for *j* only					-0.09	
					(0.08)	
NS RTA w/CAP harm. for *i* only						-0.32**
						(0.08)
NS RTA w/CAP harm. for *j* only						-0.05
						-0.07
Constant	2.23	2.42	2.32	2.31	2.14	2.21
	(1.74)	(1.75)	(1.74)	(1.74)	(1.74)	(1.74)
Observations	296,376	296,376	296,376	296,376	296,376	296,376
Overdispersion	4.23**	4.24**	4.23**	4.23**	4.24**	4.24**
Vuong test	137.16**	137.00**	137.05**	137.05**	136.69**	136.60**

Note: Robust standard errors (importing country-exporting country clustered) in parentheses. **
significant at 1%; * significant at 5%. For overdispersion the alpha value is reported, for the Vuong test
the z-score.

8.4   CONCLUSION

This chapter suggests that gravity-based evidence is supportive of the conjecture that North–South agreements involving the harmonisation of technical regulations may well reinforce hub-and-spoke patterns in world trade by inhibiting the expansion of South–South trade. The postulated mechanism behind this effect is that FTAs like EU–Tunisia or EU–Morocco which stipulate that the Southern partner harmonises its domestic regulations with those of the North may force manufacturers in the Southern partner to position themselves in high-quality segments where they do not necessarily have a competitive advantage. Even if they do (or acquire it in a dynamic setting), the advantage conferred by, say, EU standards may not carry much weight in Southern markets where those standards do not correspond to local consumer concerns.

Our results suggest that harmonisation in North–South FTAs is a non-trivial issue which should be approached strategically by Southern governments. In sectors with strong expansion potential on the Northern market, rapid harmonisation may be key to gain market access. However, in sectors with strong expansion potential on Southern markets, progressive phase-in and softeners might be considered to prevent the double-edged sword from cutting the wrong way.

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APPENDIX

List of North-South RTAs included in the study

Australia – Papua New Guinea (PATCRA)	EFTA – Mexico
Canada – Chile	EFTA – Morocco
Canada – Costa Rica	EFTA – Singapore
Canada – Israel	EFTA – Tunisia
Dominican Republic – Central America – United States Free Trade Agreement (CAFTA-DR)	EFTA – Turkey
EC – Albania	Japan – Malaysia
EC – Algeria	Japan – Mexico
EC – Chile	Japan – Singapore
EC – Egypt	New Zealand – Singapore
EC – Israel	North American Free Trade Agreement (NAFTA)
EC – Jordan	Singapore – Australia
EC – Lebanon	South Pacific Regional Trade and Economic Cooperation Agreement (SPARTECA)
EC – Mexico	Thailand – Australia
EC – Morocco	Thailand – New Zealand
EC – South Africa	Trans-Pacific Strategic Economic Partnership
EC – Syria	US – Bahrain
EC – Tunisia	US – Chile
EC – Turkey	US – Israel
EFTA – Chile	US – Jordan
EFTA – Israel	US – Morocco
EFTA – Jordan	US – Singapore

Table A8.1 *North–South RTAs and Trade[a] Coverage*

	1990		1999		2006	
	No.	Trade coverage (%)	No.	Trade coverage (%)	No.	Trade coverage (%)
RTAs	4	0.4	12	15.8	43	19.5
Of which RTAs with standards harmonisation						
Harmonisation of technical regulations	0	0	5	14.2	21	15.7
Promotion of the use of regional standards only	0	0	2	2.1	6	3.8
Promotion of the use of international standards (alone or in addition to regional ones)	0	0	2	12.1	12	11.8
Harmonisation of conformity assessment procedures	0	0	4	14.1	16	14.7
Promotion of the use of regional standards only	0	0	2	2.1	7	4.0
Promotion of the use of international standards (alone or in addition to regional ones)	0	0	1	12.1	6	10.1

Note: a Northern imports from the South.

9

The Pro-Competitive Effect of International Harmonisation of Product Standards

José-Daniel Reyes[1]

9.1 Introduction

Heterogeneity of product standards across market destination is a non-tariff barrier (NTB) to international trade as the standards impose additional costs on exporters and increase the time required to bring a product to market. This chapter examines the impact of a reduction in this NTB by looking at the harmonisation of European product standards with international norms in the electronics sector. Merging European product standards information with international trade data, I show that harmonisation increases imports to the EU but this impact varies across exporting partners. While harmonisation tends to increase exports from the developed world, it has an ambivalent impact on exports from the developing world. I propose an explanation to this puzzle by looking at the response of US manufacturing firms to this policy.

The divergent impact of harmonisation across type of countries was previously noted by Chen and Mattoo (2008) for the case of regional agreements on standards. They provide evidence that adopting a common standard in a region boosts exports of excluding developed countries to the region but reduces exports of excluded developing countries. My analysis is the first, to the best of my knowledge, to extend this result for the case of harmonisation of standards with international norms. In addition, my analysis also differs from theirs in the proposed explanation for this feature. While they argue that harmonisation of standards may reduce exports of excluding developing countries because they

are hurt more by an increase in the stringency of standards and benefit less of scale in integration, I argue that the driven attribute is the pro-competitive effect in the harmonised market.[2]

I examine the response of US manufacturing firms to a reduction of this NTB by linking industry-level EU product standards with US trade linked firm-level data. I find that EU international harmonisation of standards triggers US firms' entry into the EU – the extensive margin of trade – which fosters competition between firms and reduces market shares – the intensive margin of trade. This feature is what I called the pro-competitive effect of international harmonisation of standards.[3] Since the intensive margin effect impacts profits of all market participants negatively, the key feature that determines the overall impact in export value, at the country level, is the availability of new firms to start exporting to the EU – the extensive margin of trade. The empirical evidence suggests that, on average, the extensive margin effect outweighs the intensive margin effect for developed countries whereas the reverse is true for developing countries.

Product standards are documented agreements containing technical specifications or other precise criteria to be used consistently as rules, guidelines or definitions of characteristics to ensure that materials, products, processes and services are fit for their purpose. In contrast with technical regulations, compliance is not compulsory. Product standards, on the one hand, convey information on several product dimensions such as industrial requirements, compatibility, consumer tastes and safety, which would be costly to collect in their absence (informational effect).On the other hand, they impose additional cost for exporters to alter production processes to adapt products to standards specific to each market (cost effect). Furthermore, having country-specific or region-specific standards makes life more difficult for exporters since they need to adapt the production process to comply with different rules. Examples of product standards are safety requirements for sewing machines, measures of electromagnetic emissions from integrated circuits, specific guards for lawn mowers, and mechanical safety of cathode ray tubes.

If product regulations are set arbitrarily they could be used as an excuse for protectionism ('regulatory protectionism' in Baldwin, 2000). This may be appealing to countries since international disputes on standards have traditionally been regarded as matters of safety, health and environmental regulations that fall within the primary competences of domestic governments. They are quite different from disputes on tariffs, quotas, or intellectual property which clearly fall within the jurisdiction of the World Trade Organisation (WTO). While the Agreement on Technical Barriers to Trade (TBT), signed by the WTO member's countries in 1995, encourages countries to adopt international standards

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2   In addition, Reyes (2011) presents a model featuring the role of product standards heterogeneity across market destinations and productivity heterogeneity across firms where, independent of the level of stringency of the harmonised standard, harmonisation always increases firm-entry into the harmonised market, which in turn increases competition.

3   For a theoretical analysis of pro-competitive effect of trade policies and its impact on economic welfare see Moraga-González and Viaene (2003).

whenever possible, it also recognises the rights of countries to adopt measures to the extent they consider appropriate – for example, for human, animal or plant life or health, for the protection of the environment, or to meet other consumer interests such as the prevention of deceptive practices.

While the use of standards remains voluntary, the European Union has, since the mid-1980s, made an increasing use of standards in support of its policies and legislation. The European Commission sets compulsory regulatory goals by means of 'New Approach Directives', which outline 'essential requirements' associated with the manufacturing of products. The system in place does not, however, specify how specific objectives should be achieved. For the electronics sector, this role is fulfilled by product standards issued by the European Committee for Electrotechnical Standardization (CENELEC).[4] EU member countries are obliged to adopt these standards and withdraw any national standard that might conflict with them. If a manufacturer chooses to produce a product according to these standards, the product carries the CE mark, which implies compliance with the 'essential requirements'. On the other hand, manufacturers may use other technical specifications when manufacturing a product provided there is documentation certifying that the product meets the 'essential requirements' formulated in the Directives. Nevertheless, anecdotal evidence suggests that the prohibitive costs of the latter option push exporting companies to favour compliance with CENELEC standards (see, for instance, Hanson, 2005 and United States Trade Representative (2010)). At the global level, the International Electrotechnical Commission (IEC) is the organisation that prepares and publishes international standards for the electronics sector.

To study the impact of European product standards harmonisation on market competition, I use the CENELEC-IEC agreement to harmonise European product standards to international norms as a policy experiment. The Lugano Agreement, signed in 1991, and the Dresden Agreement, signed in 1996, sought to expedite the adoption of international standards in the EU as well as to facilitate the adoption of EU standards internationally. This synergy has taken the number of purely European standards as a share of all standards published by CENELEC from 50% in the early 1990s to 25% in 2008. In this context, the decrease in the share of idiosyncratic standards is a reduction in a NTB to international trade.

This chapter is structured as follows. The next section describes the data and presents summary statistics. Section 3 presents the impact of international harmonisation of European product standards on EU imports in the electronics sector. Section 4 shows evidence of the pro-competitive effect of international harmonisation using US firm-level data. Section 5 concludes.

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4   For example, the Low Voltage Directive (2006/95/EC) outlines 'essential requirements' for electrical equipment with a voltage between 50 and 1000 V for alternating current and between 75 and 1500 V for direct current. Among other conditions, it establishes that 'persons and animals are adequately protected against the danger of physical injury or other harm which might be caused by direct or indirect contact'. Consequently, CENELEC issued a standard (EN 50371:2002) to demonstrate the compliance of low power electronic and electrical apparatus with the basic restrictions related to human exposure to electromagnetic fields (10 MHz - 300 GHz).

9.2 DATA

The empirical analysis concentrates on the Electronic sector defined by the 4-digit industries classified under chapter 36 in the Standard Industrial Classification (SIC). This sector was chosen because of the availability of the EU product standards data and the level of disaggregation was selected in order to be able to use firm-level information from the US Census of manufacturing firms for years prior to 2002. This sector consists of 36 four-digit SIC Industries (SIC4) that range from vehicular lighting equipment and electric lamps to semiconductors and transformers. Table 9.1 provides a description of the relative level of detail between industries.

The pattern of trade in electronics between the original EU-15 members[5] and its trading partners is dominated by exports from high income countries. Table 9.2 shows the evolution of export shares across income groups and main exporting countries. Although high income countries represent the bulk of exports to the EU, middle income countries have gained market share in the last decade. At the country level, the USA, Japan and Korea – high income countries – have lost market share throughout the time span while China, Philippines and Turkey – middle income countries – have more than doubled their participation. The market share of low income countries is almost zero.

To assess the degree of harmonisation of EU product standards with international norms I use the World Bank EU Electrotechnical Standards Database (EUESDB). The EUESDB provides the first catalogue of European standards in the electrotechnical sector[6] and their relationship with worldwide standards. The database provides an inventory of the 'stock' of active standards[7] issued by CENELEC and their link with standards published by the International Electrotechnical Commission (IEC). Product standards are classified according to the International Classification of Standards (ICS) and the database covers the period 1990–2007.[8] See Portugal-Perez *et al* (2010) for a full description of the EUESDB and its construction. To assign product standards into SIC4 industries I use the mapping developed by Reyes (2011).

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5   Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden and the United Kingdom.
6   This sector refers to electrical, electronic and related technologies. More information is available at *www.iec.ch*.
7   The primary variable of interest is the total number of standards with which an exporter should comply during a particular year.
8   A list of the ICS codes can be found at *www.iso.org/iso/ics6-en.pdf*.

Table 9.1 *Four-digit SIC codes and descriptions for SIC code 36*

Industry	Description
36	**"Electronic and Other Electrical Equipment and Components, Except Computer Equipment"**
3612	Transformers
3613	Switchgear and switchboard apparatus
3621	Motors and generators
3624	Carbon or graphite products
3625	Relays and industrial controls
3629	Electrical industrial apparatus
3631	Household cooking equipment
3632	Refrigerators and refrigerating equipment
3633	Household laundry equipment
3634	Electric housewares and fans
3635	Household vacuum cleaners
3639	Household appliances, nec
3641	Electric lamps
3643	Current-carrying wiring devices
3644	Noncurrent-carrying devices
3645	Residential Electric Lighting fixtures
3647	Vehicular lighting equipment
3648	Lighting equipment, nec
3651	Radio and tv receiving sets, phonographs, record players record
3652	Phonograph records; pre-recorded magnetic tapes or wires master
3661	Telephone and telegraph apparatus
3663	Radio, broadcast, and television communications equipment
3669	Other communications equipment, nec
3671	Electron tubes
3672	Printed circuit boards
3674	Semiconductors and related devices
3675	Electronic capacitors
3676	Resistors for electronic applications
3677	Electronic coils and transformers
3678	Connectors, for electronic applications
3679	Electronic components, nec
3691	Storage batteries
3692	Primary batteries
3694	Electrical starting and ignition equipment for internal combustion engines
3695	Recording media
3699	Electrical equipment and supplies, nec

Note: This table provides the codes and description of the 36 four digit SIC industries included in the sample. Some names are truncated to reduce clutter.

Table 9.2 *Pattern of trade in electronics between the EU-15 and its trading partners*

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
High income countries	**82.6**	**82.1**	**80.1**	**79.2**	**78.8**	**78.3**	**75.6**	**72.5**	**67.6**	**63.3**	**61.1**
United States	26.4	26.4	28.4	28.7	28.2	27.5	26.7	26.4	20.5	15.6	13.3
Japan	26.4	24.0	20.2	18.4	18.7	18.7	18.5	15.6	14.8	14.1	13.0
Korea	6.2	6.8	5.4	4.4	4.3	5.4	5.9	5.0	5.7	6.1	7.8
Hungary	1.5	1.8	2.3	3.0	3.7	3.7	3.6	4.5	5.1	5.6	6.3
Singapore	4.9	4.6	4.6	4.6	4.7	4.3	4.2	3.3	3.0	3.2	3.7
Czech Republic	1.1	1.4	1.5	1.6	2.1	2.3	2.3	3.1	3.7	3.9	3.6
Poland	0.9	1.1	1.3	1.7	2.1	2.1	1.7	2.4	3.2	3.4	2.9
Switzerland	5.4	5.4	4.9	4.2	4.3	4.0	3.0	3.4	3.5	3.2	2.9
Hong Kong SAR, China	3.2	3.2	3.4	3.7	3.8	3.7	2.3	2.0	1.7	1.7	1.7
Slovak Republic	0.2	0.2	0.3	0.4	0.6	0.5	0.5	0.7	0.9	1.0	1.0
Canada	1.3	1.3	1.7	1.6	1.7	1.7	2.3	1.7	1.2	0.9	0.9
Israel	0.7	0.7	0.9	1.0	1.3	1.2	1.2	1.2	0.9	0.7	0.7
Slovenia	0.8	0.8	0.8	0.8	0.8	0.7	0.6	0.7	0.9	0.9	0.7
Rest	3.6	4.4	4.4	5.1	2.5	2.5	2.8	2.5	2.5	3.0	2.6
Upper middle income countries	**7.1**	**7.7**	**8.3**	**7.9**	**7.8**	**7.3**	**8.2**	**9.1**	**9.9**	**11.3**	**10.9**
Malaysia	5.1	5.5	6.1	5.3	4.5	4.1	4.7	4.9	4.7	5.2	4.4
Turkey	0.7	0.8	0.9	1.1	1.6	1.4	1.2	1.4	2.2	2.1	2.2
Costa Rica	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.4	1.2	1.4
Romania	0.2	0.2	0.2	0.2	0.3	0.3	0.6	0.7	0.8	0.9	1.0
Mexico	0.3	0.4	0.4	0.5	0.6	0.6	0.7	1.0	0.8	0.6	0.7
Rest	0.8	0.8	0.7	0.8	0.8	0.9	0.8	1.0	1.0	1.3	1.2
Lower middle income countries	**10.2**	**10.2**	**11.5**	**12.8**	**13.3**	**14.3**	**16.2**	**18.4**	**22.4**	**25.4**	**27.9**
China	6.2	6.0	6.3	6.7	7.6	8.5	10.7	12.5	15.9	18.4	20.9
Philippines	1.0	1.1	2.0	2.2	1.5	1.7	1.9	2.0	2.0	2.5	2.5
Thailand	1.4	1.4	1.5	2.0	1.9	1.9	1.7	1.5	1.6	1.5	1.7
Indonesia	0.6	0.5	0.5	0.6	0.6	0.6	0.7	0.8	1.0	0.9	0.8
Tunisia	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.7	0.7	0.7
Rest	0.6	0.8	0.8	0.9	1.2	1.1	0.7	1.0	1.2	1.4	1.3
Low income countries	**0.1**	**0.0**	**0.0**	**0.0**	**0.1**	**0.1**	**0.0**	**0.0**	**0.1**	**0.0**	**0.0**

Note: This table shows the export share by country and by income group. Numbers are the share of export value of each cell (country-year or income-year) in total EU imports in a given year. Country classification is taken from the World Bank Country Classification (http://data.worldbank.org/about/country-classifications).

Source: COMTRADE

In order to see the changes in the harmonisation rate within industries and across time, I define the non-harmonised share of standards for industry i in year t (NH_t^i) as the number of CENELEC standards that are not 'identical' to an existing IEC standard as a share of the total number of standards in each SIC4 industry. This definition is convenient because a reduction in this variable (higher harmonisation level) is interpreted as a reduction in a NTB and can be compared with a reduction in tariff duties. Tariff rates are also computed at the industry-exporter-year level (τ_{jt}^i) as the weighted average rate across all 6-digit HS products within each SIC4 industry, using the EU's import value as weights. For some products, tariffs were binding to zero by year 2000 due to the Information Technology Agreement (ITA), which is a tariff-cutting mechanism enforced by the WTO between nations accounting for at least 90% of world IT trade. These zero-tariff bindings were on an MFN basis and thus available to exports from any other WTO member country.

Table 9.3 reports average tariffs and non-tariff trade costs across SIC4 industries for five-year intervals from 1994 to 2004. European tariff rates decline across a broad range of industries over time in the Electronic sector. Indeed, over the entire period, tariffs were halved for approximately 40% of industries. The rate of tariff declines, however, varies substantially across industries. According to the directives laid down by the Lugano and the Dresden agreements, European product standards have progressively been harmonised to international norms. The decline in the non-harmonised share of standards also differs across industries. The highest reduction is among industries producing household appliances, including cooking equipment, refrigerators, laundry equipment and vacuum cleaners.

The trade costs constructed here have several advantages. First, they are derived directly from a database used by firms to document the regulation requirements to export to the European Union. Second, they vary across industries and time. Even with these advantages, some caveats should be noted. First, the EUESDB does not provide information on which to base an assessment of the relative technical complexity of individual standards. Constructing such a measure requires highly specialised technical and commercial information that is currently not available. Second, product standards might vary across products within an industry. Mapping standards to products, however, is quite difficult and would have to be done manually.[9] Given the number of standards for electronic products this option is not currently feasible.

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9 A manual mapping has been implemented for the textiles sector in Shepherd (2006) and used by Shepherd (2007) and by Czubala *et al* (2009).

Table 9.3   *Trade Costs by Industry and Year*

SIC4	Tariff rate (%)			Non-harmonised share of stds(%)		
	1994	1999	2004	1994	1999	2004
3612	1.2	2.0	0.3	76.9	49.1	46.3
3613	0.9	0.6	0.1	60.4	55.8	40.7
3621	0.7	0.6	0.2	66.7	67.3	65.2
3624	1.9	1.5	0.2	11.1	5.9	4.6
3625	0.9	0.7	0.1	71.2	58.3	41.3
3629	2.2	0.5	0.0	58.3	67.7	58.8
3631	1.8	1.5	0.5	91.4	28.7	29.3
3632	1.0	1.3	0.3	91.4	28.7	29.3
3633	1.2	1.2	0.3	81.1	39.5	46.2
3634	1.6	2.1	0.3	90.1	22.9	29.3
3635	1.7	1.8	0.4	71.4	61.3	44.1
3639	1.7	2.4	0.4	79.6	66.7	62.0
3641	1.4	0.7	0.2	42.4	35.5	30.7
3643	1.0	0.6	0.2	50.8	40.2	40.7
3644	2.7	2.9	0.6	22.9	21.5	19.9
3647	2.0	2.0	0.4	42.4	35.5	30.7
3648	1.3	1.8	0.4	42.4	35.5	30.7
3651	1.1	2.6	1.1	14.3	23.0	25.2
3652	0.6	1.3	0.1	5.6	8.1	8.9
3661	0.9	0.6	0.0	10.5	10.5	12.7
3663	0.8	1.4	0.2	20.9	16.5	14.3
3669	0.9	1.0	0.1	5.6	8.1	8.9
3671	1.9	2.6	1.0	75.0	69.2	75.0
3672	1.3	0.7	0.0	41.0	43.4	32.3
3674	2.6	0.0	0.0	100.0	84.2	39.0
3675	2.0	0.6	0.0	58.3	67.7	58.8
3676	1.9	0.3	0.0	70.6	66.7	65.2
3677	1.0	1.4	0.3	76.9	49.1	46.3
3678	1.5	0.7	0.1	54.2	54.5	45.2
3679	1.3	0.7	0.1	100.0	90.9	62.5
3691	1.0	1.2	0.2	38.9	32.5	29.6
3692	2.5	2.7	0.6	38.9	32.5	29.6
3695	1.4	0.7	0.0	5.6	8.1	8.9
3699	1.0	0.9	0.2	47.6	47.3	43.0
Average	*1.4*	*1.3*	*0.3*	*53.4*	*42.1*	*36.9*

Note: This table summarizes tariffs and the share of non-harmonised standards across 4-digits industries. Tariffs are weighted averages of the undelying six-digit codes, using EU import value as weights. The final row is the unweighted average of all manufactuing industries included in the analysis.

Source: TRAINS and EUESDB.

9.3 INTERNATIONAL HARMONISATION OF PRODUCT STANDARDS AND GLOBAL TRADE

The relationship between international harmonisation of product standards and trade has only recently started to receive attention from researchers. Otsuki *et al* (2001) provides the first case study on the beneficial impact of harmonisation on imports of groundnut products from Africa during 1988–98. Czubala *et al* (2009) later expanded this analysis to the textiles sector to find that internationally harmonised standards are less trade restrictive than purely European standards. Building on this result, Shepherd (2007) finds that although standards have a negative impact on partner country export variety – the extensive margin of trade, international harmonisation acts as a mitigating factor. Portugal-Perez *et al* (2010) offers evidence that the impact of harmonisation is also positive in more complex goods. Specifically, they find that EU standards that are harmonised to international norms in the electronics sector have a positive and significant effect on EU imports. Subsequently, Reyes (2011) examines the response of US manufacturing firms to this harmonisation process to find that it increases the probability of observing firm entry into the European market – the extensive margin of trade – and that new entrants are drawn mainly from the most productive set of firms already exporting to less stringent markets before harmonisation – the extensive margin of trade composition.

Overall, the literature indicates that harmonisation of product standards to international norms constitutes a way to boost trade. Although standards tend to hinder trade in simple products (including textiles and agricultural goods) and promote trade in complex products (including machinery and electronics goods),[10] harmonisation always exerts a positive net influence on trade flows. A graphic way to illustrate this effect for the electronics sector is depicted in Figure 9.1. Between 1994 and 2004, it shows the relationship between the log difference in total EU-15 import value in each industry and the corresponding change in the non-harmonised share of product standards. The graph shows a negative correlation indicating that international harmonisation of product standards in the electronics sector is associated with higher import volumes in Europe.

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10 This divergent effect is explained by the dual impact of product standards on production and trade costs. On the one hand, standards may impose additional costs on exporters as it may be necessary to adapt products for specific markets (cost effect). On the other hand, standards can reduce exporter's information cost if they convey relevant market information, like industrial requirements or consumer tastes, which would be costly to gather in the absence of the standards (informational effect). As it turns out, the cost effect outweighs the informational effect for simple products while the opposite is true for complex products. See Moenius (2004).

Figure 9.1 *Harmonisation and EU import value (1994–2004), all partner countries*
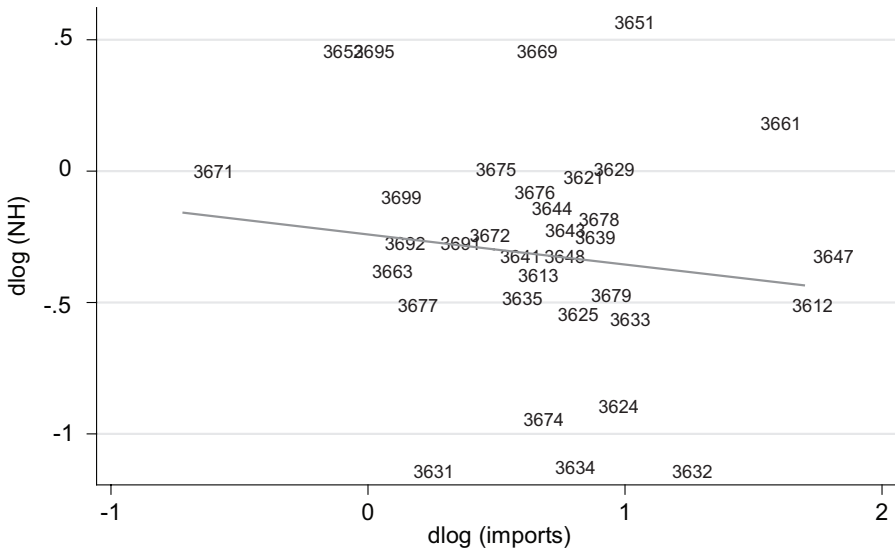
In this chapter, I explore the impact of harmonisation across different types of EU partner countries. Breaking up the total import value into imports from developed countries (high-income countries) and imports from developing countries (middle-income countries), it is easy to see that harmonisation is more strongly correlated with increments in total import value in the former group (Figure 9.2) than in the latter group (Figure 9.3). Below I show that once I control for the usual gravity variables, the correlation for developing countries vanishes while the correlation for developed countries survives.

To formally examine these empirical trends, I use a standard gravity model of international trade. Specifically, I regress EU-15 import value in industry i from country k to country j in year t (x_{jkt}^i) on distances (D_{jk}) and my measures of trade costs (τ_{jt}^i and NH_t^i). I control for cultural relationships such as colonial links ($Dcolony_{jk}$) and common official language ($Dcomlang_{jk}$) between country-pairs as well. An industry is a SIC4 code and importing countries are the original EU-15 members. I include fixed effects in the year (γ_t) , exporter (γ_k), importer (γ_j), and industry (γ_i) dimensions. Robust standards errors are adjusted for clustering at the importer level.[11]

$$\ln(x_{jkt}^i) = \beta_0 + \beta_1 \ln(D_{jk}) + \beta_2 \ln(\tau_{jt}^i) + \beta_3 \ln(NH_t^i) + \beta_4 Dcolony_{jk} + \beta_5 Dcomlang_{jk} + \beta_5 Dnew_{EUjk} + \gamma_t + \gamma_k + \gamma_j + \gamma_i + \varepsilon_{jkt}^i$$

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11 The regression is at the exporter-importer-industry-year level in order to be able to take account of sector-year variation in harmonisation, as well as country-level variation in common trade costs proxies such as distance, common language and colonial history.

Figure 9.2 *Harmonisation and EU import value (1994–2004), developed partner countries*
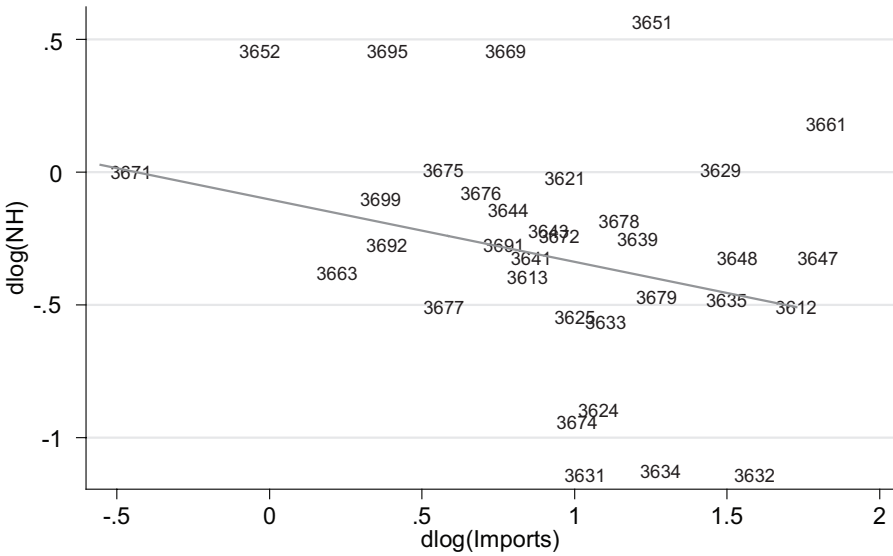
Figure 9.3 *Harmonisation and EU import value (1994–2004), developing partner countries*
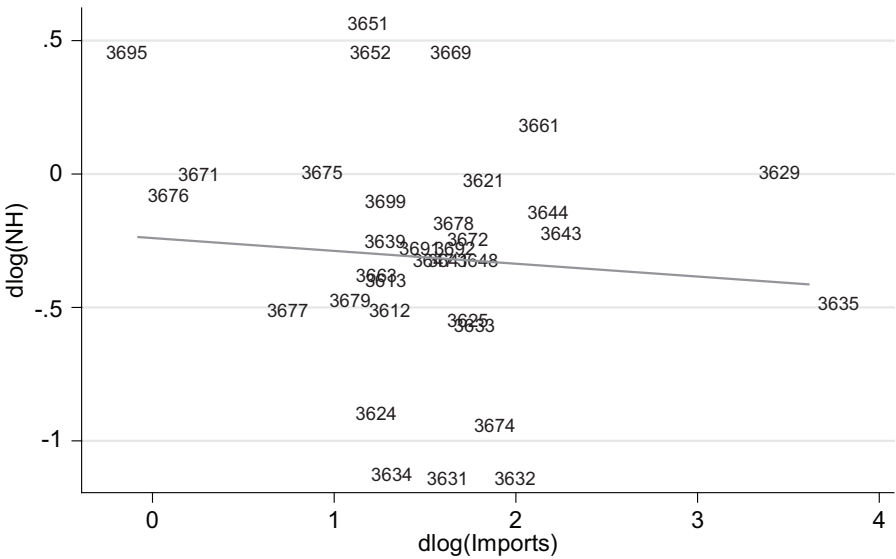
I estimate this equation by controlling for the non-random selection of observations with positive export values using the Heckman two-stage procedure. The two stages are separately identified by the functional form and by the instrumental variable from the first-stage regression. An appropriate instrument is a variable that is correlated with the probability of export but largely uncorrelated with the export volume. I follow Portugal-Perez *et al* (2010) and use the lagged decision to export as an instrument (represented by a dummy variable that is equal to one if there were country k's exports in industry i to country j in the preceding year).

Table 9.4 reports the results of estimating this equation from 1994 to 2004. The first column presents the estimation using the full set of exporting countries.[12] As suggested by previous literature, I confirm the important role for European product standards harmonisation on both the export value and the propensity to export: the negative coefficients on .and indicate that falling trade costs are followed by an increase in the propensity to export – the extensive margin of trade – as well as in the export value within industry-exporter-importer-year bins. Interestingly, product standard harmonisation seems to be more important than tariffs at the extensive margin. Columns 2 and 3 present the results of estimating the same equation for the set of exporters from developed countries and for the set of exporters from developing countries, respectively. Results indicate that European harmonisation of standards in electronics is associated with higher import value from developed countries and with lower import value from developing countries. Meanwhile a 1% of reduction in the non-harmonised share is associated with a 0.12% increase in export value within bins for the average exporter from the developed world; this reduction is associated with a 0.07% decrease in export value within bins for the average exporter from the developing world, *ceteris paribus*.

In order to present specific country evidence columns 4–5 report the results for the two most important exporters from the developed world, meanwhile columns 6–10 report results for the most important exporters from the developing world.[13] Results confirm the previous findings. On the one hand, the US and Japan benefit from harmonisation both at the export value within bins and at the propensity to export. On the other hand, there is a robust result that exports from developing countries did not benefit from harmonisation. Results at the extensive margin vary across developing countries; while the probability of exporting from China has increased in response to harmonisation, it has decreased for the case of Tunisia and has no significant impact for Turkey, Malaysia and Philippines.[14]

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12 Since exports of electronics from low income countries is almost zero (see Table 9.2), I drop these countries from the estimation.

13 Exporter countries that later became EU members were not considered for the country regressions.

14 The ability of firms to enter into the EU market in response to an international harmonisation of product standards depends, in part, on the degree of market diversification of firms in countries that use international norms (Reyes, 2011). Arguably, Chinese exporting firms are diversified enough into these types of markets so they are better endowed to enter into the EU market as a consequence of this harmonisation process

Table 9.4 *Import value to the EU-15, SIC4-exporter-importer-year, 1994–2004*

Regressor	All	Developed exporters"	Developing exporters"	United States	Japan	Turkey	Malaysia	China	Tunisia	Philippines
Heckman Outcome										
Ln (distance)	-0.814 [0.019]***	-0.871 [0.022]***	-0.193 [0.040]***							
Ln (tariff rate)	-0.056 [0.004]***	-0.067 [0.006]***	-0.045 [0.006]***	-0.127 [0.042]***	0.022 [0.073]	-0.152 [0.068]**	-0.054 [0.025]**	-0.146 [0.031]***	-0.081 [0.051]	0.016 [0.027]
Ln (NH Share)	-0.035 [0.008]***	-0.123 [0.011]***	0.066 [0.011]***	-0.487 [0.061]***	-0.365 [0.107]***	0.086 [0.059]	0.317 [0.072]***	0.044 [0.088]	0.349 [0.080]***	0.562 [0.078]***
Colony dummy	0.260 [0.027]***	0.260 [0.038]***	0.274 [0.040]***							
Common language dummy	0.212 [0.028]***	0.449 [0.038]***	-0.085 [0.045]*							
Lambda	-1.282 [0.016]***	-1.341 [0.020]***	-1.382 [0.025]***	-2.972 [1.623]**	-5.156 [0.861]***	-2.686 [0.149]***	-3.338 [0.165]***	-4.366 [0.427]***	-1.701 [0.128]***	-2.862 [0.137]***
Heckman Selection										
Ln (distance)	-0.393 [0.009]***	-0.366 [0.013]***	-0.41 [0.014]***							
Ln (tariff rate)	-0.031 [0.002]***	-0.037 [0.003]***	-0.028 [0.002]***	-0.584 [0.074]***	-0.008 [0.054]	-0.168 [0.036]***	-0.073 [0.013]***	-0.042 [0.024]*	-0.091 [0.021]***	-0.065 [0.011]***
Ln (NH share)	-0.086 [0.003]***	-0.089 [0.006]***	-0.085 [0.004]***	-0.939 [0.093]***	-0.433 [0.128]***	-0.025 [0.034]	-0.047 [0.035]	-0.177 [0.063]***	0.067 [0.032]**	-0.008 [0.030]
Colony dummy	0.280 [0.013]***	0.520 [0.023]***	0.154 [0.016]***							
Common language dummy	0.242 [0.013]***	0.192 [0.022]***	0.286 [0.017]***							
Lag export decision	1.457 [0.006]***	1.481 [0.009]***	1.437 [0.007]***	3.278 [0.880]***	2.059 [0.168]***	1.579 [0.052]***	1.823 [0.053]***	2.114 [0.100]***	1.647 [0.049]***	1.73 [0.045]***
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Exporter fixed effects	Yes	Yes	Yes	--	--	--	--	--	--	--
Importer fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	700128	223652	476476	4862	4862	4862	4862	4862	4862	4862

Note: Regressions are at the exporter-importer-industry-year level. Robust standards errors adjusted for clustering at the importer level are in parentheses. Industry fixed effects are for three-digit SICs. *** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level. Coefficients for the regressions constant and dummy variables are suppressed.

Henceforth, I propose an explanation for the puzzle of export flows across type of EU trading partners. Using the US linked/Longitudinal Firm Trade Transaction Database (LFTTD), which links individual US trade transactions to US firms in the Longitudinal Business Database (LBD),[15] in conjunction with firm level information from the Censuses of Manufactures (CM) of the Longitudinal Research Database (LRD) of the US Census Bureau, I find that EU international harmonisation of standards triggers US firm entry into the EU – the extensive margin of trade – which makes competition tougher and reduces market shares of market participants – the intensive margin of trade. Since this negative impact applies to all exporting firms, the key feature to determine the overall impact in export values is the availability of new firms to start exporting to the EU – the extensive margin of trade. Results presented in Table 9.4 suggest that the extensive margin effect dominates the intensive margin effect in developed countries while the reverse is true for developing countries.

9.4   THE PRO-COMPETITIVE EFFECT OF HARMONISATION OF PROUCT STANDARDS

In this section, I explore the firm-level relationship between changing trade costs, export growth and firm entry decisions using US trade linked firm-level data. Overall, the empirical findings suggest that EU product standards harmonisation contributes significantly to explain the export entry patterns observed among US firms. I also find that harmonisation reduces market shares of established US exporters to the EU. These findings are what I called the pro-competitive effect of harmonisation of product standards: a reduction of a NTB to international trade – harmonisation of product standards – triggers firm entry from the most productive set of non-exporters firms to the EU, which, in turn, increases competition and reduces market shares from established exporters.

I begin by estimating the impact of falling trade costs on the probability that non-exporting US manufacturing firms to the EU become exporters to the EU – the extensive margin of trade – via a logistic regression on my measure of changing trade costs, firm productivity and other firm characteristics. I use firms' information from the 1992, 1997, and 2002 US Censuses of Manufactures. I define the change in trade costs for Census year t as the log difference in tariffs over the preceding five years ($\Delta\tau^i_{t+5}$) and as the log difference on my measure of product standard heterogeneity over the preceding five years (ΔNH^i_{t+5}). These regressions are given by:

$$(spec1)\Pr(E_{t+5} = 1) = \phi(\beta_1\Delta\tau^i_{t+5} + \beta_2\Delta NH^i_{t+5} + \gamma_t + \gamma_i)$$

$$(spec2)\Pr(E_{t+5} = 1) = \phi(\beta_1\Delta\tau^i_{t+5} + \beta_2\Delta NH^i_{t+5} + \beta_3 PR_t + \gamma_t + \gamma_i)$$

$$(spec3)\Pr(E_{t+5} = 1) = \phi(\beta_1\Delta\tau^i_{t+5} + \beta_2\Delta NH^i_{t+5} + \beta_3 PR_t + \beta_4 Z_t + \gamma_t + \gamma_i)$$

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15 See Bernard *et al* (2009) for a complete description of the LFTTD and its construction. For an extensive discussion of the LBD see Jarmin and Miranda (2002).

where E_{t+5} is a dummy variable equal to one if a firm does not export to the EU in year $t+5$; PR_t and becomes an exporter to the EU in year ; is the firm's revenue based labour productivity, and is a set of additional firm characteristics. Additional firm controls include size, capital intensity, wage level, and multi-plant dummies. I also include industry γ_i and time γ_t fixed effects and cluster the standard errors at the industry level.

Results are reported across three columns in Table 9.5, with the first column focusing on my trade costs measures and subsequent columns including additional firm characteristics. Across all specifications, I find a positive and statistically significant association between product standards harmonisation and the probability that a non-exporting firm to the EU becomes an exporter to the EU across Census years. The probability of becoming an EU exporter is higher in industries with greater harmonisation of product standards. Surprisingly, EU tariff changes do not affect the probability of becoming an exporter. In specification two and three, I find, as expected, a positive and significant association between firms' productivity and their entry into exporting. Larger and more capital-intensive firms are more likely to become exporters, as are multi-plant firms and firms that pay higher wages.

Table 9.5 *Probability of entering the EU market*

Regressor	Spec1	Spec2	Spec3
Change in tariff rate	0.122	0.127	0.199
	[0.198]	[0.209]	[0.209]
Change in NH share	-0.155	-0.14	-0.145
	[0.053]***	[0.057]**	[0.059]**
Ln(labour productivity)		0.469	0.256
		[0.112]***	[0.103]**
Ln(employment)			0.255
			[0.106]**
Ln(K/L)			0.083
			[0.038]**
Ln(wage)			0.26
			[0.125]**
Multiple-plant firm			0.409
			[0.080]***
Year fixed effects	yes	yes	yes
Industry fixed effects	yes	yes	yes
Observations	4294	4294	4294
Log likelihood	-1993.16	-1973.75	-1869.62

Note: Firm-level logistic regression results. Robust standard errors adjusted for clustering at the four-digits SIC level are in parentheses. Industry fixed effects are for three-digit SICs. Regression cover two panels: 1992 to 1997 and 1997 to 2002. *** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level. Coefficients for the regressions constant and dummy variables are suppressed.

To look at the response of established exporters to the changes in my trade costs – the intensive margin of trade, I estimate an OLS regression of the log differences

in exports to the EU across Census years, $\ln(Exports_{t+5}) - \ln(Exports_t)$, on firm characteristics,

$$(spec1)\Delta_{t:t+5}\ln(Exports) = \beta_1\Delta\tau^i_{t+5} + \beta_2\Delta NH^i_{t+5} + \gamma_t + \gamma_i + \varepsilon^i_t)$$

$$(spec1)\Delta_{t:t+5}\ln(Exports) = \beta_1\Delta\tau^i_{t+5} + \beta_2\Delta NH^i_{t+5} + \beta_3Z_t + \gamma_t + \gamma_i + \varepsilon^i_t)$$

where the variables are defined as above. An observation in this regression is a firm that exports to the EU in two consecutive Census years; this explains the relatively small number of observations in the regression. As above, my regressions include year and industry fixed effects and standard errors are clustered at the industry level.

Results are reported in Table 9.6. Both columns report a positive and statistically significant relationship between changes in the non-harmonised share of standards and changes in exports from established exporters: firms in industries with a relatively greater degree of harmonisation experience a larger decrease in exports across Census years. Tariffs, on the other hand, are negatively associated with export growth. Additional results indicate no statistically significant relationship between export growth and firm productivity, employment, wages, and status as part of a multiple-plant firm.

Table 9.6   *Change in log exports from established exporters*

Regressor	Spec1	Spec2
Change in tariff rate	-0.063	-0.052
	[0.000]***	[0.012]***
Change in NH share	0.022	0.015
	[0.000]***	[0.015]*
Ln (labour productivity)		0.03
		[0.065]
Ln(employment)		-0.014
		[0.036]
Ln(K/L)		-0.023
		[0.040]
Ln(wage)		0.038
		[0.039]
Multiple-plant firm		-0.077
		[0.087]
Year fixed effects	yes	yes
Industry fixed effects	yes	yes
Observations	2279	2279
R2	0.012	0.013

Note: Firm-level OLS regression results. Robust standar errors adjusted at the four-digit SIC level are in parentheses. Industry fixed effects are for three-digit SICs. Regressions cover two panels: 1992 to 1997 and 1997 to 2002. *** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level. Coefficients for the regressions constant and dummy variables are suppressed.

9.5 Conclusions

With the decline of traditional trade barriers, differences in product standards across market destinations are increasingly viewed as impediments for trade. Yet despite the growing evidence of the negative impact of product standard heterogeneity, there is little understanding of the gains of international harmonisation on market dynamics. This chapter documents the asymmetric impact of harmonisation across exporting countries according to their level of development. Based on an analysis on the response of US manufacturing firms to this harmonisation process, I propose an explanation for the observed divergence across partner countries based on the pro-competitive effect that international harmonisation entails in the harmonised market.

The European harmonisation of product regulation to international norms in the electronic sector, which arose at the beginning of the 1990s, constitutes a way to boost imports (Portugal-Perez *et al*, 2010). In this chapter, I provide evidence about the heterogeneity of the response of export flows across partner countries to this policy: While harmonisation tends to increase exports from the developed world, it has an ambivalent impact on exports from the developing world.

To provide an explanation for this puzzle, I use highly detailed US trade linked firm data to examine the response of US manufacturing firms to the international harmonisation process in the EU. I find that harmonisation increases US export value to the EU and that this increase is due to more US firms entering the EU market – the extensive margin of trade. I also find that harmonisation decreases market shares of existing exporters – the intensive margin of trade. These two impacts on the harmonised market are what I called the pro-competitive effect of harmonisation of product standards. Since the intensive margin effect impacts profits of all market participants negatively, the key feature that determines the overall impact in export value, at the country level, is the availability of new firms to start exporting to the EU – the extensive margin of trade. Results indicate that, on average, the extensive margin effect dominates the intensive margin effect in developed countries while the reverse is true for developing countries.

This result is important because it puts the changes in market dynamics as a cornerstone to explain the heterogeneity in the responses of exporting countries to international harmonisation of standards. Before going into the policy implications of my analysis, it is useful to discuss some of its limitations. First, the results are specific to the electronics sector which is characterised mostly by north-north trade. Second, due to data availability, I do not consider an arguably important venue that may also affect market dynamics: the role of quality-upgrading in response to harmonisation of standards. An option for market participants is to respond to the pro-competitive effect by increasing the quality of their products. The difference responses between developed and developing countries along the quality margin are worth investigating in future research. This venue looks quite promising in the electronics sector in particular as these products are ones for which differentiation and variety are very important.

The policy implications of these results are of significant interest. Besides advocating for deepening the effort on international harmonisation in electronics by, for example, building on the Information Technology Agreement to commit on harmonisation of standards at the multilateral level – to the extent this is feasible – this chapter unveils the important need of exporters from the developing world to find ways to stay competitive in a world where competition is thriving due to reduction in barriers to international trade.

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10

Standards Harmonisation and Trade: The Case of the East African Dairy Industry

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10.1 INTRODUCTION

Two trends in trade policy intersect in this chapter. First, as traditional trade barriers such as tariffs and quotas are less used than before, trade policy analysts and practitioners have turned their attention to non-tariff barriers (NTBs). The expectation is that as traditional barriers come down, protectionist interests will find new outlets and NTBs are particularly well suited to the needs of protectionism. Therefore, the understanding of NTBs is a prominent field in trade research today. Second, standards are increasingly applied in international trade today. The use of standards have proliferated over the last two to three decades and now serve a multiplicity of policy objectives including trade facilitation purposes and the protection of life and health of humans, animals and the environment. In a trade policy context, standards are both indispensable for trade facilitation purposes and a source of NTBs and as such a growing issue of concern.

Policymakers often address the risk of using standards as NTBs by harmonising domestic and regional standards with their international equivalents. The idea is that if standards are made the same across borders they cannot present trade obstacles any more. The use of international standards have grown rapidly since the signing of two international trade agreements on standards and technical requirements, namely the WTO Agreement on the Application of Sanitary and Phytosanitary Measures (the SPS Agreement) and the WTO Agreement on Technical Barriers to Trade (the TBT agreement). Both the SPS and the TBT agreements encourage member countries to apply international standards but stop short of making the use of them mandatory. Since the entry into force of the agreements in 1994, many donors and international organisations have

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supported interventions in developing countries to apply international standards as the basis for domestic regulation.

This chapter argues that international harmonisation may erect rather than remove NTBs in developing country trade. The chapter is an empirical study of NTBs in the East African dairy sector. The East African Community (EAC) has focused on the removal of NTBs in an attempt to avoid a policy reversal after the Partner States courageously removed tariffs on intra-regional trade. In the dairy sector, the harmonisation of EAC standards with international ones has been financed by a donor agency and is widely supported by government agencies in the five EAC Member States with the purpose of easing regional trade. The chapter identifies and discusses present and future NTBs in East African dairy trade. Few NTBs currently constrain intra-regional trade, but the newly adopted harmonised standards may constitute a significant barrier in the future. NTBs may arise because very little milk today abides by the new harmonised standards which have not been implemented. In effect, the new harmonised standards set the bar for dairy quality so high that few producers will be able to comply even if granted a long time period (say 10 years) to adjust. The implementation of the standards would make it possible to stop a very large share of dairy trade at the border without benefiting social objectives such as food safety.

The problem is that the new harmonised standards are largely copied from international standards designed for a context widely different from the East African one. The dairy industry in East Africa is based on long atomistic supply chains dominated by small farmers and catering largely to poor consumers who consume milk after boiling it. Dairy products following international standards would be prohibitively expensive for most East Africans and would not be significantly safer from a food safety perspective because milk is boiled before consumption anyway. The case study of the East African dairy industry is an example of the import of inappropriate regulation. It is clear that globalisation and increased attention to food safety and similar social objectives regulated by standards require more and better regulation in developing countries. However, the appropriateness of the regulation is crucial to making the regulation meet the social objectives in an economically efficient way. The focus on economic efficiency is essential in poor countries. The study of the East African dairy sector discusses the role played by the reliance on foreign actors like donor agencies and international standardisation bodies for the appropriateness of regulation. Inappropriate regulation may lead to the waste of resources as well as the erection of NTBs at the border.

This paper gives an overview of the size and organisation of the EAC dairy industry as well as the role currently played by trade. International dairy trade is currently marginal in the EAC with most traded milk sold in local markets. The paper subsequently identifies and discusses potential NTBs that might constrain trade today. It then discusses the potential for future NTBs through an analysis of the newly harmonised EAC dairy standards. Finally, conclusions are offered in the final section.

10.2 Background

The present EAC was established in 2000 by Kenya, Uganda and Tanzania. Rwanda and Burundi joined in 2007. The EAC has grown into one of the most dynamic regional trade agreements on the African continent. As of January 2010, the EAC removed all tariffs on intra-EAC trade. This marks a strong drive towards a more efficient, market-driven economy. The EAC is committed to this drive and well aware that enjoying the benefits of trade requires long-term commitment. The welcoming attitude to free trade, however, can only be sustained in a context of meaningful market access. Both scholars and practitioners fear that the worldwide tendency to falling tariffs may be counteracted by policy reversals whereby less transparent trade barriers take the place of falling tariffs. The EAC has met this fear by including binding commitments for the Partner States to work towards the elimination of NTBs between them. The Partner States are to design a mechanism that identifies and monitors NTBs and commit themselves to eliminating existing barriers on intra-EAC trade.

NTBs are an incredibly difficult analytical as well as policy area. Beyond traditional barriers such as tariffs, there are no databases that may inform policymakers about the gravity of a NTB problem and where it is located. The diversity of potential barriers is extreme. This uncertainty makes NTBs the perfect place to look for protectionist interests wanting an edge in the domestic market. This report uses a value chain approach. Focus is on the dairy industry as a representative for perishable agricultural commodities. The report is based on desk research and a three-week fieldwork period in Rwanda, Uganda and Kenya during December 2009. During fieldwork illustrative data was collected primarily through stakeholder interviews. Emphasis was put on interviews with private sector participants and officials working on an everyday basis with practical trade issues.

Protectionist interests are not alone in creating trade barriers. The many new regulatory areas that EAC authorities will have to deal with as international integration continues may create trade barriers by mistake rather than design. Food safety regulation, for instance, is a new topic that may be badly designed or poorly implemented due to capacity problems rather than bad intentions.

Dairy production and marketing are a significant part of the agricultural economy in East Africa. According to FAO data, EAC countries produced around six billion litres of fresh cow milk in 2007, roughly equal to one-quarter of the total for all of Africa. Kenya and Uganda are the largest dairy producing nations in East Africa and account for 58% and 25% of the EAC's total milk supply respectively. Less than half of the total EAC production is marketed. Yet, market oriented dairying is a major economic activity in East Africa noted for extensive smallholder farmer involvement. In diverse settings throughout the region, dairy has been shown to provide small farmers a regular cash income that can be several times greater than many other types of on- and off-farm enterprise (Staal *et al*, 2003; Keyser, 2003; IFAD, 2005; Parsons and Matiru, 2008). Other recognised benefits of dairy production include growth linkages to input service

providers, milk traders and dairy processors; the ability to supply nutritious and affordable food to the local population; and opportunities for long-term expansion into growing domestic and regional export markets (Bennett *et al*, 2006).

All EAC countries have large and vibrant small-scale trading sectors in which various kinds of milk vendors, milk shop owners, and mini-processors link small farmers with city and town buyers. These markets generally have lower quality requirements than formal processors and account for 80–85% of total milk marketing in Kenya and as much as 95% of milk marketing in Uganda, Tanzania, Rwanda and Burundi.

While seen as an industry with future trade growth potential, intra-EAC dairy trade is currently very limited. Dairy exports presently account for less than 1% of total marketed production in the EAC with almost 80% of these exports destined for other EAC and COMESA Member Countries. In Kenya, for example, only 14% of total marketed milk is handled by large commercial dairy processors and the nation's largest processor says that exports account for no more than 10% of its total production with most sales going to Uganda and Tanzania. Similarly, Kenya's second largest dairy processor says it has stopped exports for several months from in late 2009 because of an ongoing drought and commitment to serve domestic markets first. Of course, some dairy firms in the EAC are geared much more toward export production, but the overall pattern whereby most milk sales are informal and most formal sales target domestic consumers must be kept in mind when discussing trade policy.

Currently, production capacity is largely determined by rainfall patterns which are about the same across the EAC countries. Given the fact that consumption patterns are the same and that each country produced the same variety of dairy products it is natural that intra-EAC trade is low. However, continuing growth in dairy production will likely lead to higher trade which is likely to cause conflicts between the EAC countries. The purpose of trade is to achieve gains according to each country's comparative advantage rather than to maximise on foreign exchange earnings or similar mercantilist objectives. During fieldwork in the EAC, many stakeholders doubted the benefits of import. For some, exports were a measure of success and imports were a sign of failure. A mercantilist view of trade is still fashionable within many agencies. The highly sceptical views on imports were accompanied by often overly optimistic views on exports, such as a focus on future EU bound exports. Scholars with the EAC still have much work to do convincing policymakers that imports play a vital economic role and that national self-sufficiency is not a viable strategy for small economies. Policy work must be focused on future developments and the need to keep markets open to allow for a more dynamic trade-oriented dairy sector to emerge

10.3 Do non-tariff barriers explain low trade?

The low level of intra-EAC trade is often perceived as a problem in trade policy discussions (World Bank, 2008). One often-offered explanation is the

proliferation of NTBs in the region. EAC countries have a long history of trade disputes flaring up in dairy. One example is presented in Box 10.1. As tariffs have been officially removed by January 2010, the use of NTBs would be a logical choice for protectionist interests in the future.

Looking at the current situation, it is also apparent that formal sector traders face many legal requirements that take time to complete and add to the total cost of regional trade. Before an export deal can be concluded, for example, participants on both sides of the border must obtain a permit from the national dairy board or other relevant dairy authority to authorise the transaction. Veterinary certificates, certificates of origin, national quality seals, and quality test results for each batch are also required. Each of these requirements has the potential to be used as a non-tariff barrier if ever there is a perceived benefit from preventing exports or keeping a neighbouring country's dairy products out.

Box 10.1 *Formal trade requirements as a competitiveness risk*

A good example of how quality standards and laboratory testing requirements can militate against formal sector trade is the story of Uganda's exports of butter to Rwanda.

In this case, Rwanda's only licensed trader bringing butter into the country decided to stop imports because of difficulties with recognition of Ugandan quality certificates and demands for additional laboratory tests by the Rwanda Bureau of Standards (RBS). According to the importer, this was because the batch numbers were not identical throughout each consignment since the butter was manufactured on different days. This problem also meant the trader could not obtain pre-clearance for the goods. As a result, the importer decided it would be easier to stop trading in butter and cancelled all orders with the Ugandan supplier.

Despite this move, Ugandan butter remained on store shelves in Kigali. As explained by border officials, it is impractical to stop small consignments from crossing and many dairy products are brought into Rwanda in small quantities, sometimes in cool boxes but otherwise with no refrigeration or other kinds of quality control. Similar to how formal sector dairy chains have a difficult time competing with informal milk vendors in domestic markets this story shows that formal traders also have a difficult time competing with informal traders in the regional market.

Although the efforts to regulate dairy trade and harmonise regional standards may seem like an obvious step towards an improved trade regime, such moves can actually have negative consequences for formal sector operators. While it is important to have a well-regulated trade system, the system must be cost competitive and simple to use in order to avoid creating further competitiveness constraints for formal dairy operators.

10.3.1 Recent trade disputes

As noted, the EAC region has a long history of dairy trade disputes. As recently as the first quarter of 2009, Uganda's largest milk processor alleged that Kenya had introduced several measures that it believed were aimed specifically at protecting Kenyan dairy plants. Specifically, the Ugandan processor complained the Kenya Bureau of Standards (KEBS) was insisting on new conformity assessments instructions for imported milk powder that required 34% protein in full cream powder when the highest level that can be achieved from cow's milk is 25–26%. The Ugandan processor also complained about Kenya banning foreign registered four-axel trucks and said that the Kenyan Revenue Authority (KRA) was holding Ugandan long-life milk at the border for more than two weeks, even when the consignments had all of the required documents. As a result, transporters were refusing to carry Ugandan products and exports more or less ground to a halt. Other dairy processors in Uganda and Tanzania made similar complaints at the time and alleged that Kenyan authorities were using whatever excuse they could find to protect local producers and keep foreign dairy products out of the country.[2]

Equally, Kenyan exporters have complained that Uganda requires additional laboratory analysis of all Kenyan dairy products whereby samples of each shipment must be sent in advance to receive the required permits. According to EAC agreements, national quality seals are meant to be sufficient proof of conformity with EAC standards, but additional testing by Uganda (and other EAC countries) has still been required leading to extra cost and delay. Moreover, Kenyan processors say that Uganda maintains higher-level national dairy standards with regard to adulteration and other quality variables than apply in the domestic market, meaning they must produce special 'export quality' batches to trade with their regional neighbour.

During a previous dispute in 2002–2003, dairy trade between Kenya and Uganda effectively came to a complete stop. According to dairy insiders in Nairobi, Kenya first refused to grant import licences for dairy products from Uganda and Uganda followed suit by refusing to grant import licences for products from Kenya. To justify these moves, various objections were raised on both sides of the border over the quality standards of the other country's product, labelling and packing requirements, and reliability of national quality seals. A similar non-tariff dispute arose in 2004 between Kenya and Zambia when a shipment of UHT milk from Kenya was rejected on quality grounds and alleged non-compliance with domestic standards in Zambia.

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2   For articles in the press on recent trade disputes, see Mwamunyange (2008), Omolo (2008) and Michael (2009).

10.3.2 Requirements for trade

The trade regime in the EAC is complex despite the recent removal of tariffs. This section presents a diagnostic approach by tracing the specific requirement for EAC dairy trade throughout the value chain. By comparing the formal requirements with current practice, this analysis aims to identify potential bottlenecks and threats to regional trade.

   Figure 10.1 provides a broad overview of current requirements for dairy trade in the EAC region. As shown, successful international trade begins with a competitive production and marketing system in the exporting country and is dependent on market demand in the importing country. Even before any potential non-tariff barriers come into play, therefore, there are many challenges to successful dairy trade at the level of primary production and post-harvest marketing.

As shown in Figure 10.1, various kinds of licences, permits and certificates are required for dairy trade within the EAC region that include:

- Dairy export permit

- Dairy import permit

- Veterinary certificates

- Conformity analysis

- Certificate of origin

- Packing list and invoice

- Import declaration form

- Clearance certificate.

From a value chain perspective, trade competitiveness can be measured by comparing the build-up of total costs with the amount customers are willing to pay for the final product. In an open economy, this price is determined competitively and value flows upstream from the consumer to each producer and marketing company in the chain. All costs and profit margins taken by sector participants before the product's value reaches the farm level, including the costs of complying with quality standards and trade reqiurements, therefore have a direct bearing on the amount that can be paid to farmers, and thus rural incomes and potential for poverty reduction.

Figure 10.1 *Flow diagram of EAC trade requirements for dairy*
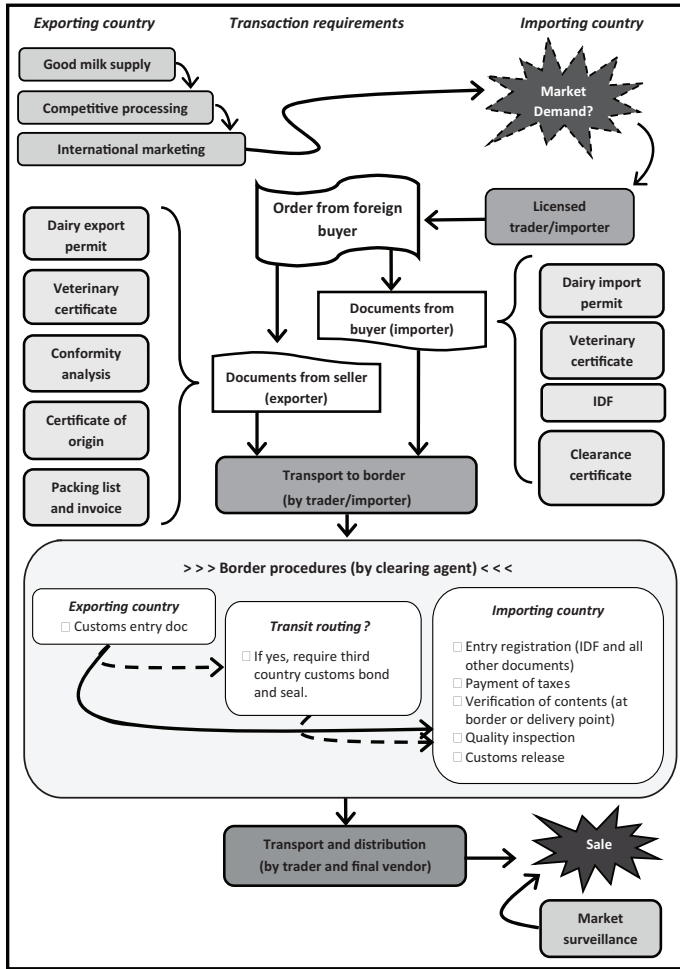
Dairy export permit. On the export side, dairy permits or 'dairy board certificates' as they are sometimes called, are issued by the relevant dairy authority to authorise the shipment abroad. Very often, dairy certificates are issued together with veterinary certificates and/or certificates of quality analysis as a kind of umbrella document to show that the exporter and specific product being traded meets all required conditions for trade. An important risk with dairy export permits is that these can be used to limit trade if the exporting country's dairy authority ever sees a benefit in doing so. During its review of each export application, for example, the website of the Kenya Dairy Board (KDB) says, 'the Board will take into cognizance the prevailing dairy production situation in the country'. The KDB maintains similar controls over dairy imports and only grants import licences after it considers the prevailing production situation in Kenya. In practice, the KDB was said to be extremely helpful in facilitating

exports by each of the Kenyan firms met. Nevertheless, these powers and similar powers in other countries are a significant threat to the ideal free trade situation based purely on comparative advantage.

Dairy import permit. Just as dairy processors are required to obtain an export permit, so too are dairy importers required to obtain a permit from their local dairy authority. In Uganda, the Dairy Development Authority (DDA) issues import permits quarterly based on a declaration of how much and what kind of dairy products the importer intends to bring in. Importers are not allowed to go beyond the declared amount and must comply with all other quality and laboratory testing requirements described below. In Rwanda, importers must apply for a permit through the Rwanda Animal Resources Development Authority (RARDA). Specifically, on collecting the application forms from RARDA, the trader must take samples of the product to the Rwanda Bureau of Standards (RBS) to obtain a 'certificate of analysis'. The analysis was said to take about two business days. When the RBS certificate has been issued, the trader is able to return to RARDA and obtain the import permit. For large and medium-scale traders that are known to RARDA, the import permit is issued for 12 months. New traders, however, are required to apply for a fresh permit for every shipment until they establish their own record of competence at which point they may be approved for a long-term permit.

Veterinary certificate. Veterinary certificates are required from both the importing and exporting country and must be obtained for each individual shipment. On the export side, the intent is to show that the dairy product is made of milk from healthy, disease free animals. Similarly, on the import side, the certificate is to acknowledge that the local veterinary authorities do not have any concerns for the animal health status in the exporting country.

As with other requirements, the traders met for this study did not raise any major concerns for obtaining the veterinary certificate for dairy, except to say that it demands a considerable amount of time and effort to collect. In Kenya, for example, veterinary certificates are issued separately for every shipment as part of the application for an import or export permit and takes three business days to process on top of the time required for the KDB to review the application and make its own recommendation. Since milk processors normally obtain their supplies from the same or similar sources throughout the year, one way to streamline the trade process would be to issue the veterinary certificates on an annual or even quarterly basis rather than for each individual shipment. If a particular disease breaks out, then the blanket no-objection letter could easily be suspended.

Conformity analysis. Beyond the trade licences and certificates issued by the local dairy authority and veterinary departments, each country's national bureau of standards also plays a role in sanctioning dairy trade. To begin with, dairy manufacturers are required to register with their national bureau of standards for the purpose of obtaining the national quality seal. According to formal EAC agreements, each country's quality mark should be accepted by all other EAC members as sufficient proof that the dairy plant and dairy product conforms to

regional health and safety standards. A computer system has been developed that allows border inspectors to check whether individual EAC products have been awarded the quality mark or not.

In practice, however, the principle of mutual recognition of national quality marks is not always applied to dairy and additional laboratory analysis is routinely carried out as a condition for regional trade. In Uganda, for example, the DDA has required dairy importers to send samples of every export batch to the Uganda National Bureau of Standards (UNBS) to obtain a local quality certificate. Batch numbers and manufacturing dates are verified at the border to ensure they match the samples that were sent to UNBS for testing.[3] Occasionally, samples are drawn at the border even with the UNBS pre-approval documents. Exporters say the testing normally takes two to three business days but can sometimes take much longer depending on any backlogs at the UNBS facility.

In an apparent change of this policy, dairy importers reported that the Uganda DDA issued a letter in December 2009 to say that it would no longer require every foreign consignment to be analysed at UNBS. While the operational details of the new policy were still being worked out at the time of data collection, the essence of the letter was that dairy exporters would have the option of carrying out the laboratory analysis in the country of origin or in Uganda. The new policy facilitates trade but still appears to fall short of the agreed EAC principle whereby each country's national quality seal should be accepted as sufficient and routine proof of conformity with regional standards.

Moreover, the problem of additional quality analysis is not unique to Uganda. Exporters to Kenya say they must provide independent laboratory results for each batch in addition to proof of the national quality mark. Likewise, dairy traders in Rwanda said that the Rwanda Bureau of Standards (RBS) sometimes insist on additional laboratory work regardless of the foreign country's quality mark or other foreign laboratory results, which are always required. Similarly, in Tanzania, dairy imports must be registered with the Tanzania Food and Drug Authority (TFDA) and Tanzania Dairy Authority (TDA) in addition to carrying the exporting country's quality seal.

Certificate of origin. Per the terms of the EAC Free Trade Agreement, certificates of origin are used to verify the goods were produced within the EAC region so that the importer can avoid paying import duty. Certificates of origin are provided by the exporter as part of the trade deal. Although the procedure for issuing certificates of origin varies from country to country, no concerns were voiced for this process by any of the people met. In Uganda, exporters said the process works extremely well and reported that all they must do upon registration is to buy a book of blank certificates from the Uganda Export Promotion Council and return the receipt stubs when the book is finished. In Kenya, certificates of origin for dairy are issued through the KDB.

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3   If samples were not sent to Uganda in advance (by airfreight or other means), UNBS inspectors will draw samples at the border and take them to Kampala for analysis. The goods are allowed to proceed, but only with a customs bond to guarantee they are not offloaded and sold before the laboratory results are back.

Packing list and invoice. As with all internationally traded goods, exporters are required to provide a detailed invoice and packing list for customs valuation. Although dairy produce from within the EAC region is no longer subject to import duty, this procedure still applies. The packing list must specify batch numbers, packing dates, expiry dates, and other key information needed to match the goods against the quality test results.

Import declaration form. The IDF is a simple customs document that the importer must fill out and submit to the clearing agent to use during border procedures. The IDF will contain information on the exporter, importer, type of product, packing date, expiry date, batch number, and other information needed to identify the product and trace its compliance with customs and standards requirements.

Clearance certificate. This document is issued by the importing country's dairy authority as final proof that the consignment meets all trade requirements. It is used to facilitate border procedures. Dairy imports to Kenya from outside the EAC region are subject to a 7% KDB levy on top of normal customs duty.

10.3.3 Transport and movement across borders

Once all required documents have been compiled, regional transport and border crossings are the next stage in the transaction. UHT milk and dry milk powder do not require refrigeration so, in many ways, are the best-suited dairy products for international trade and are usually shipped by road. Yoghurt, butter and cheese, on the other hand, require refrigeration so are much more demanding and expensive to ship. Because of the long transit times by road to some EAC markets (such as Kenyan exports to Rwanda and Burundi), dairy products often go by air. Even for shipments between Kenya and Uganda, airfreight is not unusual.

During transit, any number of logistical barriers may arise. The poor quality of roads, risk of police roadblocks including demands to inspect the produce, and excessive use of weighbridges may add time to the journey and constitute potential threats to regional dairy trade. These constraints, of course, also apply to domestic trade and can have particularly serious consequences for dairy processors because of the extra time taken to move raw milk from the farm into the dairy plant.

Although international logistics were not a major focus of investigation, it is worth noting that many of the dairy traders met for this study specifically remarked that the transport situation had improved in recent months. Whereas there were previously 47 police roadblocks on the road between Mombasa and the Malaba border crossing with Uganda, for example, there were said to be only 14 roadblocks then. Similarly, it was reported Uganda closed all highway weighbridges in October 2009 and that international transporters only need to have their truck weighed once when entering the country. Beyond international dairy trade, these moves are of obvious benefit to other sectors and may be regarded as important steps toward improving the regional trade environment.

In terms of actual border procedures, customs clearance is always handled by a licensed clearing agent or freight forwarder. No major complaints were voiced over this part of the trade process and participants in the system were virtually unanimous in saying that as long as all the paperwork is in order, everything works fine. Sometimes there may be questions over the reported value of a consignment, but with the new 0% tariff on EAC dairy imports this issue has effectively gone away.

10.3.4 Market surveillance

As shown in Figure 10.1 the final step in the trade process is market surveillance. As a matter of routine business, national bureaus of standards are meant to draw samples of imported and domestic produce from store shelves and take the product for testing to ensure compliance with standards. Consistent with the agreed principle between EAC countries of mutual recognition of each country's national quality seal, laboratory tests should not be required for entry. Instead, the only stage that additional tests should be carried out is during market surveillance when domestic and imported products are tested alike.

In actual practice, however, the preceding discussion shows that laboratory testing and other kinds of SPS analysis are almost always required for dairy products to gain entry to another EAC country. Quality certificates with matching batch numbers for the produce being traded must be presented regardless of the agreement to recognise each country's national quality mark. Because domestic produce can be sold without further testing, this practice is a significant disadvantage to dairy importers. Efforts to streamline the quality verification process, therefore, could have considerable impact on the costs of regional trade and opportunities for trade expansion.

10.3.5 Do NTBs explain low trade?

Despite anecdotal evidence of recent trade dispute and the many trade requirements that could potentially be used to disrupt trade, EAC dairy trade is not currently significantly affected by NTBs. The majority of private market actors interviewed stated that they did not experience major problems with NTBs. Actually, stakeholders report that the current trade situation has improved considerably. Other than complaints for the additional laboratory tests required by Uganda and large amounts of paperwork required for trade by all countries, no major barriers to trade were identified by any of the people met for this study. Instead, the most common remark was that as long as all the paperwork is in place everything works fine. Some of the people interviewed attributed this improvement to the recent drought in Kenya, which they say has increased the country's need for dairy imports and warned that the situation could deteriorate next time the rains are good. Others, however, took a more favourable view and put the improvement down to the general maturing of the dairy industry whereby

dairy processors and dairy regulators in all EAC countries have come to realise there is much more to gain from free trade than by working against it.

From an institutional perspective, for example, one very important development in favour of free trade was said to be the formation of the East African Dairy Regulatory Authorities Council (EADRAC) in 2006. EADRAC is composed of all national dairy boards or other government body responsible for the dairy industry in EAC countries. EADRAC meets twice a year with the purpose of providing a regular venue for dialogue on regional trade issues, non-tariff trade disputes, and other matters of regional importance. According to industry insiders, EADRAC was instrumental in resolving the complaints of NTBs against Kenya in 2009. EADRAC members explained that the phone lines are always open whenever there is an issue to discuss and emphasised their strong belief that EADRAC will make future trade disputes less likely.

Taken together the question of standards remains an important challenge to EAC free trade aspirations. On the one hand, EAC countries have committed themselves to mutual recognition of each other's quality seals, but in practice, there is an evident lack of confidence in foreign quality marks that has led to demands for extra laboratory analysis and delays in the trade process. According to a senior representative of UNBS, this issue is currently being discussed between EAC countries in an effort to harmonise certification procedures and specify the exact competences required of each certifying body. Whether or not EAC countries can reasonably expect to develop the full set of competences needed to test dairy products according to the letter of all regional standards any time soon, however, is unlikely and would almost certainly involve very high costs that are disproportionate to the value of EAC dairy exports.

Dairy trade grew strongly during the decade prior to 2008 albeit from a very low base level. Only an insignificant amount of total marketed milk is traded in some form. This is highly unlikely to be the result of NTBs. Trade remains burdened by frictional costs which traders consider an unnecessary nuisance although the aggregate costs of these were generally believed to be small.

10.4 WILL HARMONISED STANDARDS CONSTRAIN OR FACILITATE FUTURE TRADE?

10.4.1 Standards and trade in developing countries

Standards are descriptions of the characteristics of a product. They serve to establish agreement between producer and consumer on the nature of the product traded between them thereby making production and trade possible while ensuring that the product meets the expectations of the consumer. Standards serve a multiplicity of functions ranging from simple trade standards such as standards of weight and length to meeting key social objectives like food safety. Standards are part of the basic infrastructure of a market economy and little, if any, production and trade would take place without them.

Standards are defined and implemented by either private or public actors and they may be informal or formal. In developing countries much production and

trade take place with reference only to informal standards. For instance, most food is traded in open markets with the two parties to the transaction agreeing on the nature of the product based on traditional perceptions. Milk in the EAC is expected to be raw, not diluted with water, and fresh. Normally, no public agencies interfere with this trade. Naturally, one side of the transaction may know the nature of the product better than the other and this leaves opportunities for cheating open. To reduce such market fraud and its negative consequences including food poisoning, various options exists. These include, for instance, buying only from traders with a good reputation or sticking to established brands when it comes to processed dairy products. Another alternative is the use of government regulation.

Government regulation is widespread in developed countries but much less effective in developing countries. Nevertheless, at least on paper, government regulation has been widespread in the EAC dairy industry. Governments have attempted to control quality and other parameters by the use of standards and laws although without much success. Dairy regulations are often outdated and in some instances date back to the days of colonisation. Governments have been constrained both by the lack of effectiveness of their bureaucracies, the lack of funding and the challenge of controlling the dairy industry which is dominated by hundreds of thousands of small-scale milk producers and traders scattered over large rural areas with poor infrastructure. Therefore, while government regulation was extensive on paper, in reality it was very weak.

At the international level, standards have proliferated over the last two to three decades. Food safety regulation in developed countries has been expanded as a response to recent food safety scares and, at the same time, standards have become the topic of many trade disputes. Many other types of standards have been more commonly used in response to globalisation. Value chains are increasingly broken up in geographically dispersed segments and standards are needed to ensure that parts and inputs can be assembled in the final product. Many governments in developing countries and the donors and international organisations that support them have also given increased priority to food safety and other standards. The result has been reforms of food safety regulation, standardisation bodies and other legislation and institutions involved with standards.

Standards are increasingly seen as a source for NTBs. The global trend towards lower tariffs is expected to lead to the use of untraditional means of protectionism and standards are often useful in this respect as they are highly technical and can be tailor-made to stop particular imports. Two multilateral trade agreements, the SPS and TBT agreements, have been created within the WTO to distinguish legitimate standards from those that are NTBs and to outlaw the latter. Both agreements encourage, but do not stipulate, Member States to harmonise their standards. The logic behind standards harmonisation is that when standards become the same across borders, they can no longer be used as an excuse to stop trade. Since the entry into force of the agreements in 1994, many donors and international organisations have supported interventions in developing countries to apply international standards as the basis for domestic regulation.

10.4.2 Harmonised EAC dairy standards

The EAC, supported by the donor community, has chosen to harmonise its dairy standards with the international ones. In October 2006, the EAC dairy standards committee held the final meeting in the harmonisation procedure recommending the adoption of eight product standards covering butter, UHT milk, yoghurt, powdered milk, raw milk, pasteurised milk, dairy ices and ice cream, and sweetened and condensed milk. In addition, nine testing methods supporting these standards were harmonised. The standards were later adopted as common EAC standards. The Common Market for Eastern and Southern Africa (COMESA) is currently working on adopting near identical standards as common COMESA standards. In addition, efforts are underway to adopt the standards in the Southern African Development Community (SADC) as well. The basis for the EAC harmonised dairy standards is the standards of the Codex Alimentarius. The Codex Alimentarius is created by the United Nations' Food and Agricultural Organization (FAO) and the World Health Organisation (WHO) to set food standards and its standards are officially recognised as international standards in the SPS agreement. The standards are codifications of best practice in developed country agriculture.

The harmonised EAC dairy standards were formulated as a trade liberalisation policy. The standards harmonisation work was largely promoted and driven by the USAID project entitled 'Regional Agricultural Trade Expansion Support Program' (RATES) based in Nairobi together with Land O'Lakes. Working through the newly created Eastern and Southern Africa Dairy Association (ESADA) that Land O'Lakes and RATES helped to set up and fund, a process of working with regional governments began to develop and promote harmonised EAC dairy standards based on the Codex Alimentarius. The strong trade orientation of the programme is witnessed in a RATES policy paper:

> A pre-requisite for increasing intra-regional trade is rationalization of policies, procedures, regulations, rules, standards and grade that govern the dairy sub-sectors in individual countries and their harmonisation between countries. The process of rationalization and harmonisation will contribute to creating an enabling institutional environment for dairy markets in the region. (RATES, 2004: 2)

The policy paper is the main written justification of the standards harmonisation identified during fieldwork. As witnessed above, the paper demonstrates a strong belief in the existence of NTBs disguised as dairy standards.

The policy paper also recommends that trade needs should be carefully balanced with other policy objectives:

> The challenge of rationalization and harmonisation of policies therefore requires a critical look at both the relevant technical and economic issues by informed stakeholders at all levels, and a keen awareness that optimal

outcomes must be based on tradeoffs between the technical issues and the economic interests of the stakeholders. In addition, an important underlying consideration is the ability of individual countries to effectively implement/enforce the agreed on standards … [A]n important issue for the dairy markets in COMESA and EAC region is to commonly adopt standards that do not unnecessarily hurt domestic and regional markets, especially where there are insignificant exports outside a region and/or where sanitary conditions are similar (RATES, 2004: 2)

However, in reality, trade liberalisation and, in particular, the view that dairy standards constituted NTBs, became the dominating priority in the standard-setting process. Neither the policy paper nor any other background work made efforts to analyse the effects of the standards to be harmonised. Nor does the paper, or subsequent policy work, make an attempt to evaluate any gaps in implementation capacity. Such gaps would soon appear as the Codex Alimentarius standards on which the harmonised standards were to be based, were developed for much more advanced dairy industries than the EAC ones.

The standard-setting process was highly problematic. RATES supported the harmonisation process through a trade specialist within the programme itself and through a dairy technologist employed at Land O'Lakes. RATES funded a number of regional and national workshops to discuss the standards and to allow stakeholders to provide inputs into the standard-setting process. No publicly available minutes exist from the meetings, but the consultants have discussed the standard-setting process with key persons involved. These in-depth interviews have uncovered a series of key aspects of the standard-setting process:

- The process was driven mainly by the donor and by the technical agencies involved such as bureaus of standards.

- Private sector inputs were relatively limited during the process. Although some of the larger dairies in East Africa participated in some meetings, small-scale milk vendors were rarely consulted.

- Some countries participated in the standard-setting process without good knowledge about the quality of their own milk and the challenges they would face in quality upgrading.

- The standard-setting process was fast, lasting approximately one year. This appears especially rapid given the status of knowledge and the wide range of product standards harmonised across the entire sector in EAC and COMESA countries.

- The standard-setting process mainly involved dairy technologists. No assessment of economic and/or wider social impacts was made.

10.4.3 Justification of harmonised EAC dairy standards

Dairy standards do not give rise to significant NTBs in East Africa as evidenced in the discussion of potential NTBs above. However, harmonised dairy standards could still be justified by either public health or business concerns. This section discusses the harmonised dairy standards from these two perspectives.

Public health
Public health is a major motivation behind dairy standards. Milk and milk products may cause harm if the microbial quality is poor and if zoonoses, diseases transferred from animals to humans, are present. A study by the Smallholder Dairy Project analyses public health issues in EAC dairy consumption (Omore *et al*, 2005). The study demonstrates that the microbial quality is generally poor and exceeds the newly set EAC standards by a large margin. The EAC standard for raw milk sets three qualities of milk with class C/III milk being the lowest quality. For this class total bacterial count may not exceed 2,000,000 colony-forming units (cfu) per millilitre (ml) and the milk may not contain more than 50,000 cfu per ml of coliforms. The total bacterial count is mainly a function of storage temperature and time elapsed since milking, while the coliform count indicates the level of hygiene, since coliforms are microorganisms of faecal origin.

Most milk analysed by Omore *et al* exceeded the limit set for total bacterial count by a large margin. The reasons were tropical temperatures, long delivery times to the point of consumption, and lack of cooling technology. Milk fresh from the udder contains very low bacterial counts (less than 1000 cfu/ml), but the environment where milking is done, the equipment used and often poor hygiene quickly changes this. This is clearly seen in Table 10.1. Bacterial numbers are higher the further away from the production centre the milk is tested. In all samples, apart from in rural Nakuru (very close to the milking) the total bacterial counts exceed the EAC raw milk standard by a wide margin.

Table 10.1 *Average bacterial counts in Kenyan milk samples*

	Total bacterial count	Coliform bacterial count
Farmer group	7,900,000	15,000
Average	39,800,000	50,000
Nairobi	316,000,000	50,000
Urban Nakuru	20,000,000	20,000
Rural Nakuru	1,300,000	1,000

Source: Omore *et al* (2005).

Pasteurised milk also has difficulties complying with EAC standards. The EAC standard stipulates that pasteurised milk should have a total bacterial count of less than 30,000 and a coliforms count of less than 10. Over half of pasteurised milk samples failed to meet the standard. In Nairobi, 82% and 59%, respectively,

had total bacterial and coliforms counts above the standard. A substantial number of samples recorded total counts above 1 million cfu/ml.

The work done by Omore *et al* (2005) and stakeholder interviews establish that most EAC dairy products would be technically illegal if the harmonised dairy standards were implemented. Currently the threat of enforcement is remote, at least on the domestic market. The challenges of enforcing such radical changes as stopping a very large proportion of the current dairy trade are immense. However, stopping dairy trade at the border, fully or partially, is more feasible as the limited size of this trade is unlikely to cause severe market disruptions and as control points are already established.

Despite the low dairy quality observed by Omore *et al* (2005), the consumption habits of EAC consumers largely prevent the low quality of milk from becoming a major health risk. All sampled urban households boiled milk (raw or pasteurised) before consumption as did 96% of rural households. The widespread practice of boiling milk reduces the public health risks from bacterial pathogens to very low levels (Omore *et al*, 2005). It should be noted that the dairy product mainly consumed in the EAC region, that is raw milk destined to be consumed after boiling, is not covered by the adopted harmonised standards. The Codex Alimentarius, the source of the adopted standards, do not cover raw milk consumed after boiling as a separate product, due to the different consumption habits in the Western countries for which the Codex Alimentarius standards were originally developed.

Business concerns

Quality is a major issue in dairying, not only for public health reasons, but also because of the need to control shelf life and improve other economic parameters. Any market actor will need to manage quality issues and in East Africa, all commercial dairies have a quality management system. The nature and effectiveness of the quality management system, however, varies greatly depending on the capacities of the company and the quality demand of the end market it serves. Some market actors have a very rudimentary system and experience frequent problems with shelf life and inconsistent quality of their products, while others have much more modern systems that allow them to serve the high-end market.

A company may benefit from trade standards. Trade standards serve important functions both in domestic and international exchange. They transfer knowledge to market participants about the key parameters of the product they are exchanging. The variability inherent in dairy products necessitates a degree of standardisation to allow market participants to choose the dairy products that fit their production process. UHT milk, for instance, necessitates the procurement of raw milk with very low bacterial counts because the milk is for long-term storage during which even small bacteria amounts will grow exponentially. Standards also promote market growth as they reassure consumers and traders about the nature of the product exchanged. In this sense, standards make it

possible to exploit the benefits of trade like economies of scale and improved quality and increased product variety.

The formation of product quality may happen through private or government actions or both. In the EAC, quality management is mostly a private undertaking. Private dairies do their own testing and set their own quality criteria. Informal traders and consumers interact using informal understanding of what constitute acceptable quality milk as the basis. The public regulations that do exist appear to have a limited influence on the formation of quality criteria for milk and dairy products.

The harmonised EAC dairy standards play no role in private quality control. The companies will operate with their own quality requirements that may or may not be aligned with formal standards such as standards set by national bureaus of standards. It is therefore important to distinguish between such private requirements, which are often determined internally in a company to optimise its production process and marketing opportunities, and the ones coming from outside the company, such as EAC standards. A company has no use of unrealistic standards that, if they chose to comply with them, force it to produce products of a quality that consumers cannot afford and for which there is no market. The difference between the dairy markets that companies cater to in the EAC and the markets for which the Codex Alimentarius standards were developed make the new harmonised standards unrealistic and therefore irrelevant. The lack of effective private sector consultations during the harmonisation process is partly responsible for the lack of demand for the standards from EAC dairy operators.

10.4.4 The impact of harmonised EAC dairy standards

Ironically, the harmonised EAC dairy standards may in the future be used to block the trade they were designed to facilitate. Both the analysis done in Omore *et al* (2005) and stakeholder interviews confirm that most dairy products in the EAC would be technically illegal if EAC authorities were to implement and enforce the new harmonised standards. In the past, the regulatory frameworks for dairy industries in the EAC have rarely been enforced as they were rarely updated to reflect current realities and unnecessarily complicated. The regulation practised has always differed significantly from the regulation on paper. This tradition is likely to continue after the adoption of harmonised EAC dairy standards. Nevertheless, the harmonised standards may be used to stop trade at the border should protectionist interests succeed in achieving a policy reversal after the Partner States removed tariffs on intra-regional trade.

During the harmonisation process, decision-makers relied on untested assumptions about the role of the dairy standards that existed prior to harmonisation. Standards were assumed to be a source of NTBs and harmonisation was assumed to be able to remove them. Both assumptions were not analysed but have later been proved wrong. The analysis done in this chapter did not find that dairy regulation including standards caused significant NTBs.

Harmonisation could not remove NTBs, because the Codex Alimentarius standards adopted are unfit for the East African dairy industry. In principle, harmonisation simply means making standards the same across borders, but harmonisation with Codex Alimentarius standards means making standards the same and much higher. As few dairy operators are ably to comply with the new standards, they do not facilitate but in effect constrain trade.

Codex Alimentarius standards are the end result of a long process of quality upgrading in developed countries. EAC decisionmakers, including government agencies and donors, did not understand the process of quality upgrading. Dairying in the USA and the EU began when demand increased with urbanisation. Technological development allowed the introduction of mass production machinery and conservation methods like pasteurisation. In the latter half of the 19th Century dairying began to grow from an on-farm activity to industry. Standards were used to allow for long distance exchange and to safeguard consumer health. Standards were introduced gradually and represented a codification of existing best practices. Standards were targets that the industry could aim for.[4] The harmonised EAC dairy standards overlook the history of the development behind the standards. In the EAC, the introduction of Codex Alimentarius dairy standards is not a codification of best practice. It is an attempt to make the industry leap frog to a level much beyond current practice.

Some proponents of the harmonised EAC dairy standards admit that current dairy quality falls significantly short of the level set in the standards, but they argue that quality problems are a short-term adjustment problem. Further, they maintain that the industry will have to upgrade in any case. A common reason given for the need to upgrade is the desire to access international export markets beyond EAC countries. This view is problematic for two reasons: first, the strong dominance of small farmers and informal markets is not a short-term transitory phenomenon, but a key characteristic of EAC dairy farming that will persist for many decades. Second, there is a lack of demand for the standards about to be put in place. The East African consumption habit of boiling raw milk removes the public health rationale and the private market has created its own quality levels and associated quality management systems. Both public health and private market coordination can be improved, but not by offering essentially irrelevant standards.

The introduction of harmonised EAC dairy standards will have negative consequences for the rural and urban poor. First, small-scale traders have lower costs than commercial processors and therefore pay higher farm gate prices. Second, small-scale trading in itself is a major job market for poor people. Third, the harmonised EAC dairy standards impose many additional costs of compliance including investments in new equipment at the farm, bulking, and processing levels, new cold chain facilities, and public and private laboratory

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4   For an example of the use of standards and other means to safeguard public health and improve the dairy industry, see the description in Wessel (1984) of the development of the Baltimore milk market in the early part of the 20th century.

facilities. Higher processing costs must either raise the cost to consumers or will result in less total value from milk being available to flow up the chain to farmers. Simply put, inappropriate standards may mean that poor consumers will have a higher food bill and will reduce their milk consumption thereby foregoing the benefits from the nutritional value of milk, while farmers are also likely to suffer from lower farm gate prices and reduced demand.

10.5 CONCLUSIONS AND POLICY RECOMMENDATIONS

Policymakers in many developed and developing countries often chose the harmonisation of standards as a trade facilitation instrument. This chapter illustrates that the design of the harmonised standard chosen will determine whether harmonisation facilitates trade or itself becomes a source of new NTBs. Harmonised standards must be designed for local contexts. The harmonised standards will need to address key social objectives and be realistically achieved by industry operators as well as to be implementable and enforceable by local authorities given the constraints in technical, human and financial resources that they face. Poorly designed standards may themselves become sources of new NTBs. Standards that industry operators cannot achieve may force regulators of domestic production and trade to ignore them in order to avoid market disruptions. Protectionist pressures may push border regulators to enforce the harmonised standards. If they chose to do so, they can stop a large part of trade at will.

Working with donors, the EAC has adopted a series of dairy standards that are not designed to meet the social objectives of the EAC countries. Dairy products are subject to public health risks due to their highly perishable nature. This is addressed by the common consumption habit of only consuming raw milk after boiling. This consumption habit is not reflected in the new harmonised standards. Furthermore, the standards do not build on the existing quality management practices of East African dairy operators, but attempt to introduce a series of radical new production and trading methods. Dairy operators cannot meet the new requirements in an economically meaningful way. If followed, the implementation of the new standards will exclude poor producers and traders from the dairy industry due to high production costs and reduce the milk consumption of poor rural and urban consumers severely because of high milk prices.

The EAC just finished a year-long process of removing tariffs on intra-EAC trade. However, support for protectionism is still widespread among government officials and business leaders. The trade policy challenge of the coming years is to avoid policy reversals. NTBs can be expected to surface as an alternative to traditional forms of trade protectionism. The new harmonised EAC dairy standards make nearly all dairy products technically illegal and can therefore be used to stop dairy products at the border.

The new EAC dairy standards need to be reviewed in order to avoid them becoming NTBs. A review may establish demand for another set of standards

better in tune with market needs and capabilities. Such standards could be developed with the assistance of donors and international organisations. The FAO and the WHO could be consulted on the development of a standard for the unique product of the region: raw milk destined to be boiled before consumption. Standards must be assessed vis-à-vis clearly articulated demands from their users in the private sector in the EAC.

Methods for the assessment of regulation in developing countries need to be developed and incorporated into policymaking. The policy process that led to the adoption of the harmonised EAC dairy standards did not include the assessment of economic and social effects. EAC countries face many new demands for regulation in new areas such as food safety, animal health and environmental protection. The process of formulating policy must be improved to ensure that the new issues are addressed in line with the needs and capacities of the EAC region. EAC Partner States and the donors that support them should avoid importing policy measures designed for developed countries without adjusting them to the realities in East Africa. In developed countries Regulatory Impact Analysis (RIA) is increasingly being used to improve the knowledge base of policymakers. RIA includes economic and social factors that need to be explicitly analysed when considering policy alternatives. RIA is a relatively new concept in developing countries (Jacobs, 2006). The use of RIA to analyse the economic and social impact of new regulation should be considered in the EAC. Donors and international organisations with the appropriate analytical expertise would need to develop regulatory assessment methodologies suited to developing country contexts.

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PART III

Governments' Efforts to Improve NTMs

11

Improving the Quality of NTMs through Regulatory Impact Assessment

OLIVIER CADOT AND MARIEM MALOUCHE

11.1 INTRODUCTION

Whatever their form and intent, like all trade instruments, non-tariff measures create wedges between domestic and world prices. In the case of QRs, these wedges generate rents for distributors or holders of licences. In the case of technical regulations, the wedges will typically reflect compliance costs, making NTMs 'dissipative barriers'. Conceptually, NTMs can have two main direct effects on the home economy. When imposed on consumer goods, they affect poverty and the distribution of income, with sometimes non-trivial effects, in particular when domestic producers of substitute products have market power, which is likely to be the case in small markets. When imposed on intermediate products, NTMs affect the competitiveness of domestic firms. Recent work (Augier *et al*, 2011) shows that firms benefit from imported intermediates through higher productivity when they have the in-house skills to make good use of them. This suggests that NTMs making foreign sourcing costlier can reduce productivity growth.

It is critical for governments to deal effectively with NTMs for various reasons. First, NTMs encompass a broad array of regulations including traditional ones, like prohibitions or quantitative restrictions, but also new-type measures like technical regulations (TBTs) and sanitary and phytosanitary measures (SPS). While the WTO recognises the right of governments to regulate trade, governments need to be aware that these measures can raise the prices faced by households for key consumer products, in particular foodstuffs, reducing real incomes and aggravating poverty. For instance, a pilot application of the World Bank's toolkit in Nigeria suggested that eliminating import prohibitions would reduce the cost of living by enough to lift three million people out of poverty. These NTMs can also penalise domestic employers dependent on critical inputs from abroad, hurting competitiveness and employment. Another application of the toolkit in Indonesia highlighted a case where an ill-conceived technical regulation on imported steel penalised domestic producers of cars and household goods, among Indonesia's largest providers of jobs and export earnings.

NTMs can also be easily hijacked for protectionist purposes, in which case they are called non-tariff barriers (NTBs). First, they can discriminate *de facto* (eg through technical requirements designed to hurt foreign producers more than domestic ones). Second, by their complexity and the lack of transparency that often surrounds them, they can conveniently obfuscate protectionist intent and effect. Thus, they represent a largely – as yet – untapped arsenal of protectionist measures with limited and imperfect WTO disciplines.

Yet, seeking to *eliminate* NTMs altogether or to cut their number through mechanical formulae would likely be an ill-conceived quest. Most NTMs respond to a genuine public demand for traceability and protection against hazards to health and the environment – a demand that can be expected to grow over time and with wealth. Thus, except in the case of NTBs, policy toward NTMs should strive for their *improvement* through better design, smarter enforcement and, ultimately, through a robust governance framework.

11.2 IMPROVING NTMS: A GOVERNANCE FRAMEWORK

NTM improvement should be viewed primarily as a domestic issue, part of a regulatory-improvement agenda driven by a concern for enhanced competitiveness, rather than as a concession to trading partners. This is the perspective taken by countries which have successfully adopted ambitious regulatory-reform agendas, like Korea or Mexico. In practice, however, regulatory improvement is difficult. For new measures, the standard approach is 'Regulatory Impact Assessment' (RIA). For existing measures, there has been so far no tool to guide their review. This section will focus on the latter following the World Bank toolkit (Cadot, Malouche and Saez, 2012).

Trade economists and lawyers have tried to get around conceptual problems by drawing a distinction between non-tariff *measures* (NTMs) and non-tariff *barriers* (NTBs). The latter are the evil form of the former, when trade restrictiveness is, deliberately or not, in excess of what is needed for the measure's non-trade objectives. One could, conceptually, try to put the various types of NTMs in boxes corresponding to either NTMs or NTBs, and to give them colour codes – green, amber or red – like in agricultural negotiations. However, such an approach is unlikely to take us very far, as what matters on the ground has typically more to do with *how* measures are applied than with *what* measures are applied. For instance, a technical standard may create unnecessary problems essentially because it requires certification of foreign production facilities. Or, an SPS measure may be highly trade-inhibiting because every shipment is inspected, but would be much less so if customs used risk profiling.

In other words, the devil is in the detail when it comes to streamlining NTMs. Governments need to recognise the complexity and diversity of NTMs. Problems should be identified at the country level through consultations with the private sector, and technical solutions should be sought through careful analysis and private-public dialogue. The underlying philosophy is similar to what is known as 'regulatory improvement' or 'Regulatory Impact Assessment' (RIA) (Figure

11.1). However, whereas RIA is for the *ex-ante* analysis of measures – before they are adopted – the approach being discussed here aims at the review of *existing* measures, in response to specific demands from countries struggling with legacies of complicated and penalising regulations. Dealing with existing measures has the advantage of responding to an immediate need and focusing on measures whose effects are known. However, it should be thought of as only the first stage of a process of regulatory improvement covering not just the stock of existing measures, but also the flow of new ones, lest streamlining efforts would have to start all over again as poorly designed new measures keep on appearing.

Figure 11.1 *A flowchart of the NTM toolkit*
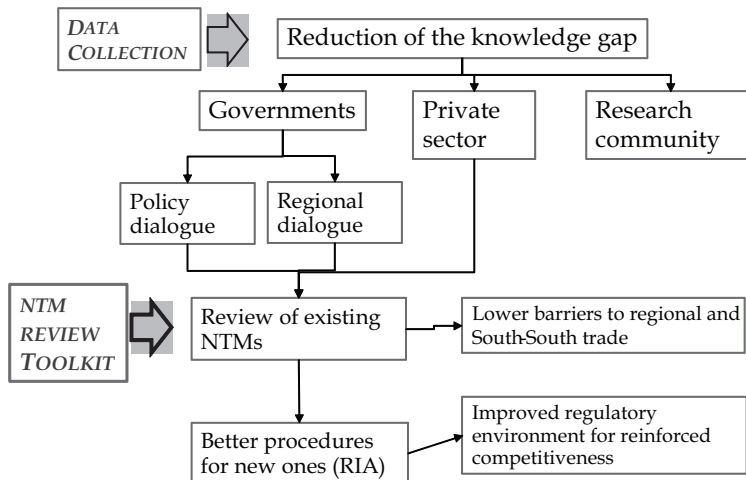
This approach relies on a more sustainable institutional set-up that would ensure continuity in the process of improving the trade competitiveness of firms as the business environment evolves over time and the stock of regulations keeps growing. It should be based on the following three pillars:

- A body dedicated to public-private *dialogue* (eg an 'NTM committee') serving as an entry point for the private sector to flag problems and contribute to the solution;

- A technical team dedicated to carry out substantial *analysis* (eg a permanent secretariat for the NTM committee) with analytical capabilities akin to those of a productivity or competition commission, to lead the dialogue into policy action;

- A *broad participation* drawing into the review process outside expertise and collaboration from line ministries involved in the issuance and enforcement of NTMs, to ensure ownership.

Regulatory reforms are intensive in political capital, and the political economy of reform is usually complex.[1] Depending on the strength of the political commitment, reform process is more or less successful in streamlining NTMs (Figure 11.2). A necessary condition to undertake the process is to ensure political support and commitment of the government and all relevant authorities that are involved in the process. This means that when designing an institutional arrangement to conduct the review of existing regulations, the process has better chances to succeed when (i) driven by a high level of the administration, which would have the appropriate mandate (supported by the law, decree or any other decision); (ii) it involves all the concerned agencies; (iii) it ensures the participation of the highest officials responsible for the issuing and administration of the measures, including the agency's staff; and (iv) last but not least, it has the necessary technical and financial resources to conduct its mandate. This means that the officials involved in the regulatory process must benefit from training, improvement of their skills as well as tools to perform their tasks.

Figure 11.2 *Political commitment and NTMs reforms*

Prevalence/severity of NTMs

	Few NTMs		Many NTMs	
	Relatively inocuous	Severe	Relatively inocuous	Severe
Strong		Full review with institutional setup	Systematic, light review	Guillotine approach
			Mauritius	*Korea, Mexico*
Weak				Ad -hoc --start with low - hanging fruit
				Indonesia, Nigeria

(Political commitment — vertical axis label)

Source: Author's elaboration.

First, strong political support is essential to achieve results and effectiveness, more than any formal basis such as law, decree, directive or resolutions – to set up any institutional set-up to lead the review process (OECD, 2009). Depending on each country's legal environment, the level of the regulations (laws, decrees, administrative decisions, etc), the level of the authority involved (national, subnational, or municipal), or the entity responsible for issuing the regulation, the reform process may be more or less complex and the institutional arrangements proposed may be more or less appropriate. The proposal outlined

1   See Tools for Effective Regulatory Reform Tools and Approaches to Review Existing Regulations, IFC Business Regulation Group and OECD Regulatory Impact Analysis: A Tool for Policy Coherence, 2009. When engaged in wide regulatory reform, other factors such as importance of external pressure, taking advantage of the context in which reforms take place (for instance economic crises) are examined in Akinci and Ladergaard (2009).

could be implemented at different levels of government, but flexibility should be considered when assessing the final approach in a specific country context.

The second condition of success is the choice of the agency/ministry responsible for the conduct of the review process. International experience with streamlining of business regulations to improve domestic competitiveness indicates that the reviewing agency/ministry should be provided with adequate independence and authority to conduct the review from the agencies responsible for issuing the regulations (Akinci and Ladergaard, 2009; Jacobs and Ladegaard, 2010). Effective results are more limited when the review is conducted internally by a ministry/agency. Regulators tend to keep most of their regulations. However, if such an institutional design is not politically feasible, the reviewing unit should be located in a politically and technically strong ministry that could provide the necessary support to conduct the process and is technically capable of conducting it. A key element of success is that the agency/ministry responsible for the review must report and be accountable for the work undertaken. Another option is to create an inter-ministerial committee responsible for conducting the review as in the case of Japan where the Regulatory Reform Ministerial Council (Chair by the Prime Minister and a Coordination Agency lead the process or in the case of Mexico where the COFEMER, a public agency, oversees the regulatory making process.

Third, the agency/ministry responsible for conducting the review process must be endowed with the necessary resources to undertake a thorough review of regulations (Jacobs and Ladegaard, 2010). Experience shows that lack of resources can jeopardise the process because the entity is not capable of undertaking or outsourcing complex regulatory issues. This means, among other things, that the agency responsible for conducting the review must have the staff and skills to conduct the review. For instance, if the review agency is endowed with one or two staff it probably will not be able to conduct a thorough review process.

Fourth, beyond existing measures, the responsibility for improving the overall regulatory environment goes beyond a single unit and is a continuous process. All relevant agencies must adopt best regulatory practices (IFC, 2010). The agency responsible for the review should also have the following responsibilities:

- to define the general principles of regulatory reform based on international best practice and to ensure that these are applied consistently across line ministries and departments;

- to oversee the introduction of regulatory impact analysis as a key tool across the government;

- to facilitate the intra-ministry coordination that is essential to address a wide range of complex multidisciplinary regulatory issues;

- to ensure transparency and public dissemination of existing regulations, their policy objectives, and provide technical background information that support the rationale for the regulations; and

- to ensure that the agencies responsible for issuing regulations are an integral part of the review process, the staff benefit from training, their skills are continuously upgraded, and the review process is not against them but with them.

When due to political factors the institutional set-up is not feasible or possible in the short term, the review process could be developed exclusively within the existing institutional framework. This would require inserting a review process within the agencies responsible for issuing the regulations. For example, Australian authorities mandate s review process within each regulatory agency, such as the Department of Agriculture, Fisheries, and Forestry; Department of Health and Ageing; the Treasury; and the Reserve Bank of Australia, among others. In order to achieve the broader goal of regulatory reform, the resources should focus on the strengthening of the regulatory agencies. More specifically this will require introducing the regulatory review process as part of the regulatory process, establishing a transparent and participatory process which will ensure accountability, and improving staff skills and knowledge on regulatory matters. The Indonesian government has just adopted a decree to institutionalise the review process for the introduction of *new* NTMs (see Box 11.1 for more details). While the toolkit focuses on the review of the existing NTMs, such institutional set-ups may be appropriate for both the review of existing and new NTMs.

Finally, the single most important initiative that countries could pursue to improve their regulatory environment is to enhance transparency. Strict transparency requirements will provide important information regarding the nature of existing regulations, the objectives they aim to achieve, and whether they are based on international standards and recommendations, among other aspects. Transparency is usually an international requirement embedded in agreements such as the WTO as well as regional and bilateral trade agreements which countries must comply with. Usually, the establishment of enquiry point which must provide information regarding regulations, including proposed regulations, is mandatory, but countries can adopt additional transparency rules beyond what is required by international requirements. For instance, they could ensure that proposed new regulations or changes to existing regulations are publicised and ample opportunity for comments and suggestions for domestic and international interested parties are provided. Enhancement of transparency has been facilitated in recent years by information and communication technologies which lower the costs of improving access to relevant information as well as the costs of providing and managing information. Moreover, transparency is both an important driver as well as a supporter of regulatory reform, increased transparency reduces policy risks for market actors and of the potential capture

of regulators by interested parties (Akinci and Ladergaard, 2009; Jacobs and Ladegaard, 2010).

Box 11.1 *Institutional set-up to streamline new NTMs in Indonesia*

Streamlining of NTMs in Indonesia has received a new impetus from the Ministry of Trade in September 2011 with the passing of a decree to launch a pilot programme establishing a review process of NTMs issued by this ministry, currently responsible for 61% of all NTMs issued.[2] The main thrust of the programme is to strip the role for reviewing NTM from unit implementing NTM and to equip the unit responsible for the former with an adequate capacity to conduct regulatory impact analysis. The decree establishs a Non-Tariff Policy Team (KNT) within the Minsitry of Trade that would essentially (i) coordinate with relevant agencies for input into formulation and establishment of non-tariff policies; (ii) formulate and submit recommendations to the Minister of Trade on non-tariff policies; (iii) monitor and evaluate the implementation of non-tariff policies; (iv) introduce non-tariff policies to stakeholders; and (v) participate in international trade negotiations in the framework of bilateral, regional and multilateral cooperation with implications for Indonesia's non-tariff policies. The Ministry has also introduced a standard operating procedure for reviewing NTMs to conduct objective and independent assessments within a specified time. The KNT Team will analyse the eligibility of a proposal related to non-tariff policies; analyse the impacts of non-tariff policies using appropriate analytical tools; verify consistency with other policies and with the World Trade Organization (WTO) rules or other international agreements; and hold a public consultation through meetings with stakeholders or field surveys. The KNT Team should settle the problem within a maximum of 60 working days.

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2   Decree 709/M-DAG/KEP/9/2011.

11.3 Improving NTMs in Mauritius

With the reduction in tariffs, non-tariff barriers (NTBs) have emerged as a clear obstacle dampening the competitiveness of the domestic economy. Compliance with foreign NTBs was also harming Mauritius's competitiveness and integration with the world economy by holding back its export performance (see Box 11.2 for examples). When the benefits that would come from a systematic process for the review of regulations and their implementation became apparent, the

government decided to address it. Following the budget of June 2008[3] the Ministry of the Economy was given the task of reviewing all permits and licences. The Permit Review Committee (PRC) was established to review the need for import/export permits where they exist and also to submit proposals for the simplified processes and procedures for the issue of such permits and clearances.

The PRC conducted 13 meetings and consultations to carry out its mandate. First it identified a number of tariff lines requiring permits/clearances from various ministries and organisations and requested each ministry to submit the necessary justifications for maintaining permits under their purview. The PRC also requested all players to submit the detailed procedures, fees payable and processing time for the issuing of permits as well as the relevant legislation related thereto. As a result of this exercise, the PRC identified about 19 types of permits affecting trade, issued mainly by six ministries, affecting almost a quarter of the tariff lines (2,610 out of 6,298 tariff lines), and for reasons of consumer protection, safety, phytosanitary, compliance to norms or standards or compliance to international agreements. The need to have import/export permits was found unnecessary or unwarranted in 72 instances.

The PRC also noted that some ministries or their departments experience capacity constraints in terms of human resource and/or logistics, which greatly hampers the delivery of timely services, thus unduly increasing the processing time. It was therefore recommended that apart from streamlining the procedures and processes involved, permit issuing bodies must ensure that the relevant unit or section are adequately staffed and equipped. There should also be a general shift in mindset with focus on a high standard of service delivery and only essential control exercised.

In addition to this important identification step, the World Bank has recommended the government to take this effort to the next step in order to further streamline the regulations by:

1.   Setting-up a permanent regulatory review committee. The committee would have the responsibility to (i) define the general principles of regulatory reform based on international best practice and to ensure that these are applied consistently across government, (ii) review all new and important existing regulations, (iii) oversee the introduction of regulatory impact analysis as a key tool across the government and (iv) facilitate the intra-ministry coordination that is essential to address

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3   The 2008–9 Budget Speech said 'We also want to significantly simplify the processes for exports and imports where bureaucracy can be unnecessarily exasperating in many cases. Our aim is to reduce the number of permits relating to imports and exports to the essential minimum, by 1st July 2009. Provisions will therefore be made under the Customs Act to suspend as from 1 July 2009 all permits relating to imports and exports, except those that are considered essential. All permit authorities will have until end December 2008 to submit to a Committee chaired by the Ministry of Business, Enterprise & Cooperatives, any justifications for maintaining the permits they issue. Furthermore, the Committee will recommend measures to lower compliances costs.'

a wide range of the regulatory constraints, including duplication of requirements, that currently undermine competitiveness in Mauritius.

2. Introducing an appeal mechanism to allow affected stakeholders the opportunity to contest the decisions of civil servants that they feel are incorrect, unfair or arbitrary.[4]

3. Assessing capacity gaps that undermine effectiveness and efficiency of implementation. There are clearly critical gaps in the standards and conformity assessment infrastructure that need to be identified and prioritised in terms of the needs of business and the effectiveness of regulations.

11.4 A BROADER BUSINESS REGULATORY REVIEW

The streamlining of permits and licences quickly showed its limitations when it came to trade regulations. A diagnostic of the trade regulations revealed a number of cases that deserved a deeper regulatory analysis (Box 11.2) and weaknesses in the regulatory system in Mauritius that were undermining competitiveness, including the following:

- *Lack of systematic approach to assessment of regulations and their implementation*. There is no clear procedure by which actual and proposed regulations are examined and analysed in terms of whether the design is (i) consistent with the underlying public policy objective; (ii) with the capacity in government ministries and agencies and in the private sector to effectively implement them; and (iii) in terms of impacts on competitiveness, growth, employment and poverty.

- *Lack of transparency in design and application of regulations*. Regulations are not designed on the basis of consultation with interested stakeholders, even with different parts of the government.

- Resources are poorly utilised due to *lack of risk-based approach* in many parts of the government. With the exception of customs, most government ministries and agencies take a very rigid approach to the implementation of regulations and do not apply risk-based approaches that target resources, such as those for inspection, at the most risky transactions. Hence, for example, firms and individuals that have invested in processes and procedures that reduce risks face similar compliance costs to those whose products or activities pose a greater risk. These high compliance costs and lack of flexibility inhibits international

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4   One possibility that is used in other countries is to establish an Ombudsman Office. Best practices have been defined by the International Ombudsman Association at *http://www.ombudsassociation. org/standards.*

competitiveness relative to countries where the regulatory system and its application encourages rather than stifles innovation.

- *No recourse to dispute procedures*. Individuals and firms have no formal mechanism by which to challenge the decisions of civil servants as they implement regulations. In practice, large firms and well connected individuals are able to exert influence and obtain a review of decisions that they deem to be incorrect or inappropriate. Rather, it is small and new firms and ordinary individuals who are unable to dispute decisions.

- *Duplication of requirements across government ministries and agencies*. In many cases different parts of the government are making similar requirements, such as permits or licences or the testing of products, to achieve the same objective. For example, the export of fish requires permits from the Ministry of Fisheries and the Ministry of Agriculture to achieve essentially the same purpose of monitoring and collecting information – information that is recorded by Customs and is readily available from them. This also reflects the lack of coordination and cooperation across ministries and agencies. While different groups of the government have responsibility for achieving the same public policy objective, the efficiency in achieving this objective is often undermined by lack of coordination and cooperation.

- *Lack of competitiveness perspective in many ministries and agencies*. The culmination of the weaknesses discussed above is that in designing and implementing regulations few ministries or agencies consider the impact of their actions on the competitiveness of the country. An approach, similar to that of trade facilitation in customs, should spread throughout the government leading to a move from a rigid, non-contestable mindset in which ministries and agencies seek to shelter their requirements and approaches to one in which civil servants are continually exploring ways in which to better design and implement regulations through openness and cooperation.

Recognising the need to carry out rigorous regulatory review for NTMs, the government of Mauritius established a public-private Review Committee for NTBs chaired by the Ministry of Foreign Trade in April 2009 to (i) define the general principles of regulatory reform across government; (ii) review all new and important existing regulations; (iii) oversee the introduction of regulatory impact analysis as a key tool across the government; (iv) facilitate the intra-ministry coordination, and (v) encourage and assist the roll out of IT solutions for trade facilitation across ministries and agencies.

    While this initiative has generated a productive dialogue among various agencies and the private sector and helped identify various cases requiring government attention, it was unable to address the issues because of lack of

human and technical capabilities dedicated to this process. Given government commitment to remove non-tariff barriers, it further strengthened the business regulatory review mechanism in early 2012 by establishing a joint public-private business facilitation task force to coordinate and strengthen the review process for business regulations and procedures, including a committee dedicated to the review of NTMs. This new task force will bring together the programs of four existing subcommittees dealing with business regulations, including the NTB Review Committee. It also put in place a secretariat, with administrative and technical staff and a dedicated budget, to make sure regulatory impact assessments would be conducted when needed. In addition, with the assistance of the World Bank, two pilot regulatory impact assessments were conducted on the two cases presented in Box 11.2, and helped interested parties, the government and the private sector, identify the exact nature of the problem and think about measures to address it.

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Box 11.2 *Two regulations hurting the competitiveness of Mauritian firms*

Regulation designed without reference to impact and capacity to implement

Problem: The government has defined the public policy objective of shielding citizens from toxic chemicals. The relevant regulation, the Dangerous Drug Act, seeks to achieve this through a ban on the importation of a defined list of toxic chemicals. While it is straightforward to prevent the importation of these materials in bulk form there is lack of capacity to inspect and test imports of final products containing the toxic ingredients, such as paints.

Impact: While Mauritian firms can no longer use the toxic chemicals, products containing toxic chemicals are still being sold on the domestic market. According to the Mauritius Paint Association the production cost of paint produced in Mauritius has increased since the non-toxic ingredients that must now be used are more expensive. Thus Mauritian producers of paint find it more difficult to compete in the domestic market with imported paints that contain the toxic materials. They also are at a competitive disadvantage in export markets that have not banned such ingredients.

Application of plant health regulations creates obstacles to flower exporters

Problem: Mauritius was a global market leader in traditional (red) anthurium flowers. International competitors have developed new species with various colours as a marketing tool. Local producers would like to respond by growing a wider range of varieties. There is a risk of bacterial infection from imported plants that could spread to domestic production. In response the government has banned the import of adult plants regardless of the risk that the particular imports may contain the bacteria. There is a lack of capacity to test plants for the presence of the bacteria and the government currently does not accept certificates confirming that plants are disease free from foreign laboratories. This forces exporters to import only baby plants (which do not contain the bacteria) which take up to two years to grow and be sold on the market.

Impact: The import ban of adult plants prevents exporters from following market trends. The industry association claims that Mauritius has been marginalised as a single variety exporter.

12

Addressing Non-Tariff Barriers on Regional Trade in Southern Africa[1]

Ian Gillson and Nick Charalambides

12.1 Introduction

A recent and important trend in global trade has been the proliferation of regional trade agreements (RTAs) and Southern Africa is no exception. Regional integration efforts in Southern Africa, such as the Common Market for Eastern and Southern Africa (COMESA), the Southern African Development Community (SADC) and the Southern African Customs Union (SACU), have all sought to liberalise trade between countries so as to increase bilateral trade flows, diversify exports by overcoming the limits of small markets, and deepen specialisation through achieving economies of scale. Yet despite these efforts, regional trade outcomes in Southern Africa have been limited due to barriers, particularly non-tariff barriers (NTBs), that persist on regional trade.

This chapter summarises a number of new studies that identify the most restrictive NTBs in Southern Africa. In doing so it illustrates some of the costs associated with them using information gathered from some of the largest firms engaged in cross-border trade. For example, Shoprite (a South African retailer) reports that it costs US$500 for each day one of its trucks is delayed at a land border in the region. These costs serve to thicken regional borders and prevent the development of regional production chains. While there have been some success stories in the region with countries attempting to tackle NTBs, more needs to be done. For example, Mauritius has established a joint Public-Private Standing Committee that is undertaking a review of all NTBs there. Nevertheless in Mauritius, as well as elsewhere, knowledge-sharing of good practice for regulatory reform remains lacking. This chapter, therefore, aims to be a first step in filling this gap by providing some practical policy recommendations on how countries, either unilaterally or through a regional process where there might

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be gains from cooperation, can remove existing NTBs as well as discipline the development of new ones.

12.2 Non-tariff barriers in Southern Africa are critically hindering regional trade

Harnessing regional integration more effectively would help all countries lower their cost base and enhance global competitiveness. For the smaller Southern African countries, regional integration also offers the prospect of improved access to neighbouring markets as well as the potential to attract greater SADC-orientated foreign direct investment (FDI). In some of these countries (eg Lesotho) greater exploitation of the regional market is critical to reduce reliance on the export of a single product to a single market (eg clothing to the USA under the African Growth and Opportunity Act). For the larger countries, especially South Africa, regional integration offers opportunities to enhance the sustainability of existing exports (eg light manufacturing) on world markets by lowering costs through specialisation within the context of regional value chains.

However, while Southern African countries have been able to successfully eliminate a significant proportion of their tariffs on intra-regional trade, [2]corresponding increases in regional trade have only been relatively minor. For example, while their trade with the world tripled in value between 2000 and 2008 (from US$50 billion to US$153 billion) the share of regional trade has remained steady at close to 10% over the last decade despite Southern African countries growing faster than the world average for most of this period. In contrast, the most successful RTAs in Asia and Latin America (eg Association of Southeast Asian Nations, Mercado Común del Sur) have reached and maintained much higher degrees of regional trade (typically over 20% of their total trade), often through intensified intra-industry linkages. Furthermore, traditional exports of agricultural raw materials and minerals continue to dominate regional trade in Southern Africa. Cases of diversification into higher value-added manufacturing exports to the region remain limited (eg Mauritian clothing to South Africa) and strong trade imbalances persist between South Africa and the smaller countries. Regional production chains for exports to the world market remain virtually non-existent.

A lesson from successful regional integration experiences elsewhere in the world is that tackling tariff barriers is necessary but not sufficient to enhance trade. Countries must also aim to facilitate trade by addressing NTBs and,

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2   For example, SADC has been trading on preferential terms since 2000 and, based on the implementation of tariff phase down commitments under the Trade Protocol, formally launched a free trade area (FTA) in August 2008. Under this, 85% of intra-SADC merchandise trade is now duty-free with most of the remaining 15% comprising sensitive products scheduled to be liberalised by 2012 (2015 for Mozambique). A subset of five SADC members have already established a customs union under SACU which is 98% duty-free. COMESA has had an FTA since 2000 and formally launched a customs union in June 2009. Trade between FTA and non-FTA countries is conducted on reciprocal terms under a preferential trade agreement.

here, Southern Africa has made notably less progress than with its tariffs. For example, despite the SADC Trade Protocol making specific reference on the need to eliminate NTBs and urging countries to refrain from imposing new ones, moving from identifying NTBs to their reduction and removal has proven to be challenging. Consequently, borders remain thick as major obstacles to trade remain which undermine the predictability of the trade regime and reduce investment in the region.

NTBs reported by firms in SADC countries under the Monitoring Mechanism (explained in greater detail later) affect products which jointly account for US$3.3 billion, or one-fifth, of regional trade (see Table 12.1 for a summary and the Appendix for the detailed mapping). In other words, even those NTBs that have been reported in SADC (and others may have yet to be notified) affect products in which there is already significant regional trade. This is also a least cost estimate of the impact of NTBs on trade in the region since some barriers are so restrictive that preferential trade is effectively prohibited (eg wheat flour) and, of course, there are others which affect all trade and not just individual products (eg customs delays, transport costs) which are not captured here. So NTBs are widespread in their effect on regional trade, even more so than these figures suggest.

The mapping also shows that some sectors are affected more than others by these barriers and individual sectors are often affected by more than one type of barrier. For example, regional trade in wheat is affected by import bans, import quotas, import levies, single marketing channels and rules of origin (for flour), although obviously not all countries impose all barriers. NTBs also disproportionately affect regional trade in agricultural commodities, particularly sugar, maize, wheat, meat products (including poultry) and dairy products. Regional trade in manufactures is mostly affected by restrictive rules of origin (ROOs) as well as product standards.

The impact of these barriers on firms is pervasive. In a recent firm survey, which included five SADC countries, roughly 80% of respondents indicated that they faced some form of trade barrier within the region (RTFP, 2009). Over half of the respondents indicated that the cost of these was equivalent to 5% of the c.i.f. value of their imports/exports. A further 24% of respondents indicated a 5–15% attribution to trade barriers; and 23% faced increased trade costs of over 15%. There is also evidence to suggest that barriers in one form or another exist in all countries throughout the region. In an inventory of NTBs in SADC (RTFP, 2007), all countries were found to maintain at least 'moderate' barriers.

Table 12.1 *NTBs that have been notified to SADC affect at least one-fifth of regional trade*

Barrier	Examples of products affected	Volume of intra-SADC trade potentially affected (% of total)
Import bans, quotas and levies	Wheat, beer, poultry, flour, meat, maize, UHT milk, cement, sugar, eggs, pasta, sorghum, pork, fruit and vegetables	6.1
Preferences denied	Salt, fishmeal, pasta	0.4
Import permits and levies	UHT milk, bread, eggs, sugar, fruit and vegetables, livestock, liquor, cooking oils, maize, oysters	5.4
Single marketing channels	Wheat, meat, dairy, maize, tea and tobacco, sugar	5.3
Rules of origin	Textiles and clothing, semi-trailers; palm oil; soap; cake decorations; rice; curry powder; wheat flour	3.0
Export taxes	Dried beans, live animals, hides, skins, sugar, tobacco, maize, meat, wood, coffee	4.8
Standards/SPS/TBT	Milk, meat, canned tuna, beer, honey, maize bran, cotton cake, poultry, batteries, sugar, coffee, ostriches	2.5
Customs-related	Wine, electronic equipment, copper concentrate, salt, cosmetics, medicines	5.2

Source: Authors' calculations based on NTBs reported to the SADC-EAC-COMESA Non-Tariff Barrier Monitoring Mechanism.

Global evaluations of NTBs indicate that they are in most cases more restrictive than tariffs. While quantitative assessment of their impact is challenging, in great part due to large gaps and errors that persist in the data on NTBs, there is a growing body of work that attempts to estimate their tariff equivalence. A recent survey of this analytical work (Carrere and De Melo, 2009a, b) indicates that on average the tariff equivalent of NTBs is 40%, which for most products is higher than the MFN tariff applied by most countries. Assuming 40% *ad valorem* equivalence on the SADC NTBs cited above, would imply a crude cost estimate of US$1.3 billion per year attributable to those barriers that have been notified – roughly equivalent to the GDP of Lesotho.

Consequently, NTBs significantly increase costs for consumers as well as for those firms that source intermediate inputs from the region. For example, Woolworths reports that prices in its franchise outlets in non-SACU SADC countries are 1.8 times higher than those within SACU because of higher expenditures associated with sending goods to these markets as well as the higher costs of doing business in them.

12.3 WHAT ARE THE MAIN TYPES OF NTBS AND HOW MUCH DO THEY COST?

There are opportunities for Southern African firms to trade across regional borders that currently remain unexploited due to policy constraints that serve to raise trade costs. Five main types of NTB can be broadly identified as follows.

12.3.1 Inefficiencies in transport, customs and logistics raise costs

In order for RTAs to be effective, it is critical that regional trade be able to move without hindrance. Many Southern African countries are landlocked, making road and rail networks very important in linking these countries to the regional market as well as to the rest of the world via the main ports in South Africa, Mozambique, Angola and Namibia. However, high transactions costs are being incurred from inadequate transport infrastructure, inefficiencies in customs procedures (including delays at road checks, borders and ports) as well as poor quality and costly logistics due to weak competition among service providers. They serve to raise logistics costs; require suppliers to keep higher levels of inventories; result in a higher percentage of goods not reaching final markets; raise the rate of spoiled agricultural goods; and, ultimately stunt the development of new exported products. They also restrict the potential of countries to scale up existing production for global markets by first exploiting regional sources of comparative advantage. Shoprite reports that for each day one of its trucks is delayed at a land border costs $500. Port congestion is also an important source of delay, particularly at Durban – the busiest container port in Africa. The Citrus Growers' Association in South Africa has estimated that delays at the Port of Durban cost its growers US$10.5 million per season (on approximately US$400 million of exports), based on an average delay per load of 12 hours for each of the 20,000 citrus laden trucks that enter the port during peak season. One measure being used to reduce these costs is to increasingly use the Maputo port for citrus exports, which can offer a saving of up to US$0.50 per carton loaded from the Maputo Cold Store compared with the cost in Durban (Cargo Info Africa, 2010).

Another source of delay within the region concerns work permit regimes for foreign truck drivers. In South Africa, visitor visas were once accepted for this purpose but foreign drivers will soon be required to obtain work permits that necessitate trucking companies proving that the skills being sought outside of South Africa are not available locally and involves vacant posts being advertised. There are between 1,600 and 2,000 foreign drivers in South Africa who will require these permits, affecting 6,000–8,000 deliveries per month. While ostensibly designed to protect employment opportunities, the new approach does not take into account prospects for South African drivers operating elsewhere in the regional market. In particular, it risks South Africa's neighbours reciprocating with similar measures that will force South African drivers working in these countries to also apply for work permits. For example, Angola has already signalled its intention to put in place a similar requirement for South African

drivers crossing its border. Such restrictions could significantly impede the movement of trucks in and out of countries and make trade even more difficult for regional exporters than it is now.

12.3.2 Cumbersome fiscal arrangements widen borders

Fiscal borders between Southern African countries are unnecessarily complicated, inefficient and contribute to higher trade costs. The three main reasons SACU retains internal border posts, even though it is a customs union, are to capture data on intra-SACU trade for revenue sharing purposes; administer NTBs such as infant industry protection; and, because domestic sales taxes have not yet been harmonised, requiring refunds and payments. The costs and delays associated with these procedures reduce trade flows between Southern African countries. Those costs attributable to the differences in VAT alone have been estimated to be up to 2% of the value of each transaction on intra-SACU trade (Jitsing and Stern, 2008).

12.3.3 Restrictive rules of origin limit preferential trade

Onerous local content requirements in ROOs (see Box 12.1), particularly in labour intensive sectors (eg clothing) that use capital intensive inputs not produced competitively in the region (eg fabrics), and high compliance costs with administering certificates of origin reduce the utilisation of tariff preferences offered by RTAs and therefore the incentive for Southern African firms to trade regionally.

Box 12.1 *Rules of origin in Southern African RTAs*

ROOs are particularly restrictive in SADC as they are more product- and process-specific than the simple value-added criterion that can be used under the COMESA FTA, for example.

SADC ROOs have also continued to evolve over the past few years. The treatment of products in some sectors has remained subject to review and negotiation. One of the most contentious issues has been the differentiated treatment afforded to SACU clothing imports from four of the Least Developed Countries in SADC. Mozambique, Malawi, Tanzania and Zambia (MMTZ) have in the past received a derogation to rules of origin (single transformation) under which certain lines of clothing exports from these countries to SACU would qualify for preferences under SADC even if they were cut and sewn (locally) from third country fabric. This derogation from the main rules has, however, been subject to various restrictions, including quantitative restrictions and administrative arrangements to ensure compliance as well as time limits. It was last granted at the end of March 2007 and was set to run through 31 December 2009. Since then, however, the derogation has not been renewed.

COMESA ROOs have also caused problems. While COMESA has a 35% value-added rule, not all countries have adopted this. Egypt unilaterally imposes a 45% local content requirement. Until recently, Zambia, Uganda and Malawi did the same. Rules in two sectors have also proven to be particularly contentious under COMESA. For wheat flour, the 35% value added rule has generated difficulties for exporters in Egypt and Mauritius that do not produce wheat grain, but import the raw material from the world market. In periods of high wheat prices, such as those experienced in 2007, this meant that these countries were unable to meet the value added requirement. With palm oil, there have been disputes over ROOs (eg Zambia-Kenya) because of difficulties assigning value added. These have arisen because a number of products can be produced from the raw material such as cooking oil, soap and margarine.

A recent example of the costs associated with meeting ROOs involves SACU moving to more restrictive rules (double transformation) on selected clothing imports from Malawi, Mozambique, Tanzania and Zambia following the expiration of the MMTZ-SACU Market Access Arrangement at the beginning of 2010. This has resulted in some clothing producers in these countries (eg Bidserv in Malawi) being no longer able to compete in the regional market. It has also further distorted investment decisions as some of these firms have relocated to Botswana, Lesotho, Namibia and Swaziland (the BLNS countries) as a result of the change to avoid the loss of preferences in supplying the South African clothing market. For other products where ROOs have been so contentious (eg wheat flour) or simply not agreed (eg electrical products for which rules were only finalised in April 2010), preferential trade within the region has been effectively prohibited (Naumann, 2008). Further costs arise from the administrative requirements for certificates of origin that can account for nearly half the value of the duty preference. For example, Shoprite spends US$5.8 million per year in dealing with red tape (eg filing certificates; obtaining import permits) to secure US$13.6 million in duty savings under SADC – see Box 12.2.

Box 12.2 *Obstacles facing the utilisation of tariff preferences in SADC – the case of Shoprite*

Shoprite is a South African-based retail and fast food company that operates over 1,200 stores under various names (eg Shoprite, OK Furniture, Checkers, Hungry Lion, Usave, House & Home) in 17 African countries as well as in India. The company accounts for 30% of South African retail trade.

In 2009, over 15% of Shoprite's revenues came from stores based outside of South Africa. In securing these a key challenge has been administering compliance with the rules of origin to qualify for SADC preferences on consignments sent to its stores outside of SACU. In particular:

- The value of SADC preferences to Shoprite was US$13.6 million in 2009 on US$550 million of exports to the region (implying an average margin of preference of 2.4%).
- The cost of proving eligibility for preferences on this trade was US$5.8 million in the same year. These costs comprised: 40% for staff to maintain customs data for shipments; 40% on in-house clearing and forwarding; and, 20% on the maintenance of a library to demonstrate compliance with rules of origin for suppliers.

Source: Charalambides (2010).

Woolworths does not use SADC preferences at all in sending regionally produced consignments of food and clothing to its franchise stores in non-SACU SADC markets. Instead it simply pays full MFN tariffs because it currently deems the process of administering ROO documentation to be too costly. Estimates indicate that in 2009 it could have benefited from duty savings of US$0.6 million on US$3.2 million of exports to Mozambique, Tanzania and Zambia – a cost saving on imports for franchise holders in these markets of up to 19% and a strong incentive to source more of its products regionally (Charalambides, 2010).

12.3.4 Poorly designed technical regulations and standards limit consumer choice and hamper trade

Standards regimes in Southern Africa are characterised by an over-reliance on mandatory inspections and certifications; unique national (rather than regional or international) standards and testing; overlapping responsibilities for regulation; and occasional heavy government involvement in all dimensions of the standards system. These factors create unnecessary barriers to trade, especially when technical regulations and standards are applied in a discriminatory fashion against imports.

International good practice is to use technical regulations only to ensure core public policy objectives such as maintaining safety. Voluntary standards should be used in all other cases, including indicating quality attributes. But in several Southern African countries, scarce public resources are being wasted on developing and enforcing technical regulations that go well beyond issues of purely public interest. One example is imported shoes in Mauritius where the Chamber of Commerce has proposed the development of a regulation to govern their quality to prevent the entry of low-cost Chinese sandals that are perceived to have a tendency to wear more quickly than domestically produced ones. However, these are often the only shoes that the poorest people in Mauritius can afford to buy. One way to overcome such problems would be to use regulatory impact assessment (RIA) more systematically. However, in most Southern African countries there are often no such procedures by which technical regulations are assessed in terms of their consistency with public policy objectives; whether countries have the capacity to implement them; or their impact on trade and competitiveness. In particular, no 'Office of Regulatory Reform' exists in any Southern African country to review the justification for both new and existing

technical regulations. This absence of RIA causes problems and raises costs. For instance, the environmental levy on plastic bags in South Africa was introduced to reduce problems associated with litter, but the technical regulation governing it also affects unrelated issues such as the minimum thickness of the plastic to be used as well as the size of the text that must be printed on the bags.

Regional efforts to harmonise standards are another way to ensure that national differences between them do not restrict trade. While these are under way (eg SADCSTAN),[3] application remains lacking. Only Namibia and Swaziland have adopted all 78 (to date) of the harmonised standards for the region. Participation in regional standards development has also been uneven. For example, 60–70% of regional standards developed have been to South African standards although increasingly other countries are becoming more active in making proposals such as Mauritius (for agricultural products), Botswana (for construction services) and Zimbabwe. A key challenge, therefore, is participation of the region. There are different levels of standardisation competence, skills and knowledge between countries. The national standards bodies in a few SADC countries (eg Tanzania, Malawi and Zambia) are also involved with efforts to harmonise standards in other regional groups, namely COMESA and EAC, which has resulted in different harmonised standards being agreed between the RTAs. It will be important for the various regional groups in Southern Africa to coordinate on standards issues so that there is a consistent approach. Another challenge is language. Portuguese, French and English are used in the region so if a regional standard is developed in, say, English then Mozambique will be required to translate this into Portuguese and then back into English again before the harmonised standard is agreed. This is a costly process and can cause disputes. For example, a standard on salt developed by Mozambique was translated into English by South Africa but when translated back to Portuguese was objected to by Mozambique on the grounds of it not being the same as the original. Some regional standards have also been developed without any real sense of prioritisation and so are unlikely to bring significant increases in regional trade (eg for frozen peas and dried apricots).

12.3.5 Other NTB restrict opportunities for regional sourcing

A plethora of other barriers such as trade permits, export taxes, import licences and bans also persist. Shoprite spends $20,000 a week on permits to distribute meat, milk and vegetables to its stores in Zambia alone. For all countries it operates in, approximately 100 (single entry) import permits are applied for every week; this can increase to up to 300 per week in peak periods. As a result of these and other documentary requirements (eg rules of origin) there can be up to 1,600 documents accompanying each truck that Shoprite sends with a load that

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3   All the national standards bodies in SADC participate in the SADC Cooperation in Standardization (SADCSTAN). Within it a country can propose a regional standard for a good or service that if accepted by other Member States is adopted as a harmonised SADC standard.

crosses a SADC border. Lack of coordination across government ministries and regulatory authorities also causes significant delays, particularly in authorising trade for new products. Another South African retailer took three years to get permission to export processed beef and pork from South Africa to Zambia.

In SACU, national protection for infant industries is often used to justify import bans. Namibia has used the provision to protect a pasta manufacturer and broilers and maintains protection on UHT milk. Botswana has recently limited imports of specific varieties of tomatoes and UHT milk. Seasonal import restrictions on maize wheat and flour also ensure that domestic production is consumed first. For example, Swaziland's imports of wheat flour were effectively banned for six months of 2009 since no import permits were issued for half of that year. Again, the costs associated with these types of NTBs are high and do not appear to be based on developing globally competitive firms nor creating significant numbers of sustainable jobs. For example, Erasmus and Flatters (2003) find that the infant industry protection for Namibian pasta created less than 20 jobs in the domestic firm that the measure was designed to protect. Its main impact was to limit consumer choice, since quality imported pasta made using durum wheat became almost unavailable. Flatters (2010) estimates that protection for Botswana UHT milk costs consumers there US$16 million per year – equivalent to US$160,000 per job created where the annual wage of a factory worker is less than US$1,500. While South Africa is not allowed to protect its industries from regional competition under the SACU Agreement, it has managed to shield its mature sectors through imposing anti-dumping duties (most recently on imports of chicken).

Export restrictions also impose costs and inhibit the development of regional supply chains. A case in point is small stock exports from Namibia. Since 2004, the Government has established a scheme ostensibly designed to encourage local slaughtering. Initially under this scheme quantitative restrictions were imposed on live sheep exports together with a discretionary permit system. These have since been replaced by a flexible levy. Under the former arrangement, the quantity of live sheep allowed to be exported from Namibia was set as a function of the number of sheep slaughtered domestically, initially set at 1:1 but later on restricted to 1:6. Under the latest arrangement, quotas for live sheep exports have now been abolished and replaced with a flexible levy of between 15 and 30%. The new arrangement is proving to be more restrictive than the old quota system and has virtually closed the border for the export of any live sheep from Namibia to South Africa. The impact of these restrictions on the live sheep industry in both Namibia and South Africa has been highly adverse, particularly on abattoirs situated in the Northern and Western Cape. Between July 2004 and May 2008, Namibian exports of live sheep to South Africa decreased by 84%. Total sheep production in Namibia also fell from one million in 2008 to 800,000 in 2009 as traditional sheep farmers have switched to alternative activities such as cattle and game farming. There have also been cases of livestock smuggling from Namibia to avoid the tax. In South Africa, 975 full-time jobs are at risk due to the scheme, especially in the bigger abattoirs that focus on slaughtering Namibian

sheep during the low season to better utilise their slaughter capacity (Talijaard *et al*, 2009). In addition, Namibian sheep farmers have become almost entirely dependent on the four Namibian export abattoirs where they were previously able to sell more sheep to the South African market to receive a higher price (PWC, 2007). Over 90% of the sheep carcasses slaughtered in Namibia are exported to South Africa, so the small stock export abattoirs in Namibia have essentially been granted an oligopsony where they do not have to perform efficiently nor pay a competitive price for their inputs. The same abattoirs were supposed to do value addition to the primary product for the benefit of domestic industry but over the past six years have largely failed to do so apart from slaughtering and skinning sheep locally.

12.4 WHAT IS BEING DONE AT THE REGIONAL LEVEL TO COMBAT NTBS?

The implication of the various types of NTBs described above persisting on Southern African regional trade is that they impose unnecessary costs for producers that limit trade and raise prices for consumers. Many of these barriers are simply wasteful and do not serve any real purpose. Import bans and delays create uncertainty over market access and limit investment. Thick borders and fragmented regional markets limit possibilities for the development of regional production chains in which countries can exploit their comparative advantage in specific tasks and intra-industry trade. Finally, the heavy bureaucratic burden imposed on all regional trade flows ties up regulatory and customs resources, limiting their attention on achieving the most pressing public policy objectives such as promoting effective border management.

Nevertheless, RTAs in Southern Africa have made some progress in addressing NTBs but much more needs to be done.

A key consideration has been those conditions under which non-tariff *measures* are needed to achieve legitimate public policy objectives such as health and safety, versus those in which they are not such that they qualify as non-tariff *barriers* and are simply protectionist either by design or intent and impose unjustified burdens on trade. At the multilateral level, some core principles have been specified in making this distinction. These are based on ensuring transparency, non-discrimination, adopting international best practice wherever possible (eg using harmonised standards for goods and services where these have been developed) and proportionality to risk. However, NTBs may also include measures that are *applied* but not *legislated* for, such as the very real possibility in some African countries that a customs official asks to see an import permit when one is not legally required. NTBs may also include those regulations that while seeking to achieve legitimate objectives nevertheless impose unnecessary burdens on trade through inappropriate *application*. In other words, the barrier can relate to the administration of the measure as well as the measure itself.

Article 6 of the SADC Trade Protocol calls for the elimination of all existing forms of NTBs and for Member States to refrain from imposing new ones. While implementing this Article remains a major challenge, SADC Ministers of Trade

have identified ten categories of NTBs for 'immediate' action.[4] In some of these areas there has been progress, but in most barriers still remain. For example, the 2007 Audit on the implementation of the SADC Trade Protocol found that all Member States were implementing many of the trade facilitation instruments that had been rolled out by SADC. However, those governing the creation of a regional transit system, for example, have yet to be implemented (see Table 12.2).

At the country level there have also been some significant improvements. For example, Mauritius has made strong progress in the automation and streamlining of its customs clearance and port management processes.

Nevertheless, success in removing NTBs in other areas has been lacking. Instead, efforts have tended to focus on improving the monitoring and reporting of NTBs rather than elimination. Monitoring has taken two main forms:

i.   Audits on the implementation of the SADC Protocol on Trade have been undertaken every year since 2007. Their main focus has been on progress in removing tariffs facing regional trade, as per countries' commitments, but they also review some NTBs, in particular those relating to trade facilitation and rules of origin.

ii.   A SADC Trade Monitoring and Compliance Mechanism (TMCM) was established in mid-2008. This has two distinct elements: an online NTB Monitoring Mechanism (NTBMM) which records reported NTBs by firms; and the elimination and reduction of barriers (both tariffs and NTBs) following bilateral negotiation or outcomes from the various Dispute Settlement Mechanisms.

The publication of NTBs under the auspices of the NTBMM is a major step forward. However, while the NTBMM is now well established (see Box 12.3), there are problems with it including misidentification of some of the barriers reported and, most importantly, very slow progress in resolving the barriers once they have been notified.

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4   These being: (i) cumbersome customs documentation and procedures; (ii) cumbersome import and export licensing/permits; (iii) import and export quotas; (iv) unnecessary import bans and prohibitions; (v) import charges not falling within the definition of import duties; (vi) restrictive single channel marketing; (vii) prohibitive transit charges; (viii) complicated visa requirements; (ix) pre-shipment inspection; and (x) national food security restrictions.

Table 12.2   *Some progress has been made in implementing trade facilitation instruments in Southern Africa*

Instrument	Bot	Les	Mal	Mau	Moz	Nam	RSA	Swz	Tan	Zam	Zim
WTO Valuation Agreement	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
HS Coding System a) Schedule of Concessions b) Migration to 2007	Y ongoing	Y	Y	Y ongoing	Y	Y	Y	Y	N	Y	Y
SADC Certificate of Origin	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Regulations on SADC ROOs	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
ROOs manual for customs	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
ROOs manual for traders	N	N	N	N	N	N	N	N	N	N	N
SADC SAD	SAD 500	SAD 500	N	N	N	SAD 500	SAD 500	SAD 500	N	N	N
Voucher for correction of SAD	Y	Y	N	N	N	Y	Y	Y	N	N	N
Guidelines for completion of SADC customs documentation	Y	N	N	N	N	N	N	N	N	N	N
SADC Transit Regulations	N	N	N	N	N	N	N	N	N	N	N
SADC Transit Documentation	N	N	N	N	N	N	N	N	N	N	N
SADC Transit Customs Bond Guarantee	N	N	N	N	N	N	N	N	N	N	N
SADC Integrity Plan to fight corruption	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
MOU for SADC customs administrations	Y	Y	Y	N	Y	N	Y	Y	Y	Y	Y
Conformity assessment	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Source: USAID (2009).

Box 12.3 *The Tripartite NTB Monitoring Mechanism*

The NTBMM is shared between SADC, COMESA and EAC and is a web-based 'post box' where the private sector can report complaints against NTBs to regional trade in Southern and Eastern Africa. So far under this 335 complaints of NTBs have been made against barriers originating in 20 countries. The greatest number of complaints have been made by Namibia (66), followed by South Africa (46), Zimbabwe (39) and Malawi (30). The three most cited countries for imposing NTBs are South Africa (40 cases), Namibia (36) and Malawi (33).

An assessment of the types of barriers cited in the NTBMM is set out in Table 12.3. Trade-related administrative barriers are reported most frequently by firms as an impediment to regional trade, followed by import licensing.

Table 12.3 *NTBs cited in the NTB Monitoring Mechanism*

Barrier	No. of complaints
Trade-related administrative NTBs	74
Export and import licences	39
Transit issues	36
Technical barriers to trade	32
SPS measures	28
Rules of origin	26
Clearance procedures	24
Quotas	19
Payments	21
Customs documentation	17
Pre-shipment inspection	8
Customs valuation	6
Immigration requirements for cross-border traders	4
Safeguards	1

Source: Charalambides (2010).

An example of the former is that the NTBMM once reported South Africa as maintaining a single marketing channel for maize, whereas this system has long been abolished since the 1990s. Another example of misidentification concerns Angola, where weak 'postal services' were cited as an NTB.

Regarding the latter, there is presently no mechanism for ensuring that countries follow a process of either justifying their NTBs or agreeing to remove or reform them once a barrier has been notified. The absence of a clearly defined *enforcement* mechanism with strict time limits for action and sanctions for non-compliance means each country is effectively responsible for voluntarily removing or reforming their NTBs. This 'moral suasion' approach to removing NTBs in Southern Africa has largely failed to yield results, in contrast to more legally binding mechanisms used elsewhere (eg in the European Union) with sanctions. Consequently, within the SADC Region, of the eight complaints

raised to date against South Africa (forty if complaints from EAC and COMESA countries are included), only four have been resolved. For complaints against other SADC countries there has only been one resolution of an NTB reported via the NTBMM.

12.5 PRIORITIES FOR NTB REMOVAL IN THE SOUTHERN AFRICAN MARKET AND IMPLEMENTING REFORM

The commitment of Southern African countries to remove NTBs has, to date, focused on identifying and monitoring them. Raising awareness and improving transparency are necessary steps but it is becoming increasingly apparent that they are not sufficient due to the lack of progress in removing these barriers that, as we have shown, remain extremely costly. It is therefore important to consider how these remaining NTBs should be dealt with and which among them should be prioritised for reform.

First, one of the biggest issues for regional trade integration in Southern Africa, especially for manufactures and agro-processed products is undoubtedly ROOs. The issue has gained particular prominence in light of the planned (almost Africa-wide) Tripartite FTA where one set of rules for all countries will have to be agreed. Harmonisation of the different rules among the regional groups will not be possible because process requirements, employed for example under SADC, cannot be easily harmonised with the value addition criteria under, for example, COMESA. So a new set of ROOs will need to be agreed, either based on one of the existing arrangements or completely redesigned. Characteristics of ROOs that would encourage the development of new export industries would include:

- Providing exporters with a *choice* as to which rule (defined simply and transparently) they apply, for example either a change in tariff heading test (ideally at a disaggregated product level) *or* a reasonable value-added rule (20%).

- Eliminating process-specific ROOs which set out how a product is to be made for originating status to be conferred.

- Removing the requirements for certificates of origin for products with nuisance tariffs, for example those with preference margins below three percentage points.

- Enforcing these simplified rules more consistently and effectively at customs to mitigate any concerns over leakage or trade deflection.

- Greater use of risk assessment, especially for large, trusted regional traders who should not require a certificate of origin for each consignment but, instead, should be able to submit these electronically per batch.

Secondly, resolving the other types of NTBs, both existing and curtailing the development of new ones, is also vital as these are critically restricting trade in the region particularly for primary agricultural commodities. Among these the most serious barriers are import bans, quotas, permits and licensing that are often implemented by countries with little or no consultation with their trading partners.

Thirdly, while tariffs have been largely reduced across the region, NTBs arise in those sectors where tariff peaks persist. One advantage with addressing any remaining tariffs is that tariff reform can often be dealt with by a 'stroke of the pen' approach, as opposed to some of the other barriers where reform will be complex, perhaps more costly and certainly more involved. High tariffs are especially restrictive because concerns of leakage from third countries can create the need for NTBs (eg ROOs) as well as affecting trade in all sectors as border checks are intensified to check for transshipments of these products. Lower, more uniform external tariffs would significantly reduce the need for many of the barriers which persist on regional trade in Southern Africa as would the development of policies that directly address the difficulties that protected sectors may be facing such as assisting labour in these industries to retrain in tasks where employment opportunities are much better.

Fourthly, reducing bureaucratic requirements, streamlining border management procedures and implementing trade facilitation measures, including one-stop border posts (OSBPs), have significant potential to lower border crossing times and reduce transport costs, at least along the main corridors in Southern Africa. There is also increasing political willingness among governments for this type of reform to go ahead sooner rather than later. For example, the South African Government has recently identified OSBPs as one focus area it wishes to develop for regional integration in the next 12 months. Namibia has already put forward five proposals for OSBPs that link it to South Africa and one with Botswana. However, revenue concerns among the smaller SACU countries risk impeding reform. Overcoming this challenge will require the development of better ways to capture trade flows across SACU borders than those currently employed as well as an open discussion about alternatives to the current revenue sharing arrangement that might be more effective and sustainable.

In undertaking these reforms, how can existing structures for NTB removal in Southern Africa be strengthened?

Most NTBs can be addressed nationally. Few reforms need wait for regional agreement and much can be done both unilaterally and bilaterally to increase regional trade in both goods and services. Most of what is needed to improve any country's international competitiveness and business climate can therefore be done at home. In particular, unilateral action focused on the needs of firms and services providers would do much to take countries further along the road to deeper regional integration by lowering the costs they face as they trade across borders. For example, using regulatory impact assessment more systematically would ensure that each country's regulations are consistent with the public policy objectives they are designed to meet; are minimally trade-distorting; and that

those countries have the capacity to implement them. Unilateral action also does not require all countries to move at the same pace. Countries that wish to reform deeper or sooner can do so and in the process provide valuable experience to other countries on what works and what does not, including through the use of regional knowledge platforms to share good practice in regulatory reform for goods and services.

Nevertheless, regional interventions can also be important through the realisation of scale economies in the development of more efficient and effective regulatory frameworks. There are clear benefits from closer regional coordination in regulation and standards, particularly where national agencies face technical skill shortages or capacity constraints. For the smaller Southern African countries it may be better to seek closer collaboration within SADC or COMESA by relying on fewer regulatory agencies and accredited regional providers of testing, inspection and certification for both goods and services instead of many national ones that each require recurrent budgets and often have trouble with staffing. Continuing to develop appropriate and prioritised regional standards (eg through SADCSTAN) would also reduce the costs of market participants operating across borders and reduce the scope of capture by national private sector interests. Unlike other regions in Africa, Southern Africa has the distinct advantage that world class testing bodies and accreditation services are already available in South Africa. Regional integration could leverage the capacity of these institutions to support exports and capacity in the less advanced countries as well as eliminating the need for double testing or certification of regional trade. Alternatively, countries could consider steps towards implementing a regional framework for mutual recognition so that conformity assessment procedures, for example, are recognised in other countries or qualifications and licences for service providers issued by one country are accepted by all. Otherwise, suppliers are obliged to perform additional or repeated tests of their goods and services in regional markets or to invite foreign inspectors, thereby increasing trade costs.

The most significant regional initiative to remove NTBs in Southern Africa is the NTBMM. However, as discussed earlier the main achievements to date of this have been monitoring and reporting of barriers rather than actually removing them. In order to make the NTBMM more effective the following steps should be taken:

- Proper identification of the barriers, whether they really exist and whether the measures being notified are unnecessarily trade restricting given the public policy objectives they are trying to achieve.

- Prioritising NTBs for removal, in particular by linking those that have been notified in the NTBMM to core barriers identified by SADC for 'immediate removal' (eg unnecessary import bans and prohibitions) as well as those types identified in this paper (eg ROOs).

- • Developing a pilot between a few countries (eg South Africa-Mauritius) to ensure the mechanism is well adapted to the needs of its users, as well as providing valuable demonstration effects to the rest of the region on the benefits of removing NTBs.

Finally, any mechanism aimed at removing NTBs will be of little use if new barriers can be freely erected to take their place. New NTBs should be disciplined through the greater use of regulatory impact assessment. In addition there should be stricter notification requirements such that information on any planned measure is provided to regional trade partners in good time before it is implemented. Another significant problem is that many NTBs in the region are not legislated for, so the existing monitoring mechanism must also be strengthened to deal with new barriers of this type that cannot be picked up through regulatory impact assessments.

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APPENDIX: MAPPING OF NTBS REPORTED BY SADC COUNTRIES TO PRODUCTS AND
POTENTIAL TRADE AFFECTED

NTB	Products affected	Value of intra-SADC trade, 2008 US$ million (% of total non-fuel intra-SADC trade)
Import bans	Wheat	83.71
	Beer	46.81
	Poultry	43.79
	Wheat flour	15.40
	Meat products	69.22
	Maize	228.45
	Milk (sterilised, UHT)	36.59
	Total	*523.97 (3.2%)*
Import quotas	Maize	228.45
	Wheat	83.71
	Maize meal	24.24
	Flour	16.46
	Cement	143.71
	Sugar	93.86
	Salt	46.43
	Poultry	43.79
	Eggs	9.26
	Tobacco	150.90
	Fruit and vegetables	172.34
	Total	*1013.153 (6.1%)*
Import levies	Milk (sterilised, UHT)	36.59
	Pasta	15.34
	Sorghum	19.62
	Wheat	83.71
	Chicken and eggs	16.54
	Dairy	144.41
	Pork and poultry	54.87
	Beer	46.81
	Total	*417.89 (2.5%)*
Preferences denied	Salt	46.43
	Fishmeal	0.02
	Pasta	15.34
	Total	*61.79 (0.4%)*
Import permits and licensing	Milk (sterilised, UHT)	36.59
	Bread	35.10
	Eggs	9.26
	Sugar	93.86
	Fruit and vegetables	172.34
	Livestock	26.58
	Liquor	35.06
	Cooking oils	255.60

NTB	Products affected	Value of intra-SADC trade, 2008 US$ million (% of total non-fuel intra-SADC trade)
	Maize	228.45
	Oysters	0.01
	Total	*892.85 (5.4%)*
Single marketing channels	Wheat	83.71
	Meat	69.22
	Dairy	144.41
	Maize	228.45
	Tea and tobacco	183.81
	Sugar	170.92
	Total	*880.52 (5.3%)*
Rules of origin	Textiles and clothing	306.60
	Semi-trailers	37.47
	Palm oil	28.42
	Soap	46.96
	Cake decorations	0.04
	Rice	53.65
	Curry powder	0.01
	Wheat flour	15.40
	Total	*488.55 (3.0%)*
Export taxes	Dried beans	15.28
	Live animals, hides and skins	26.58
	Sugar	93.86
	Tobacco	150.90
	Maize	228.45
	Meat	69.22
	Wood	194.90
	Coffee	12.73
	Total	*791.92 (4.8%)*
Standards/SPS/TBT	Milk	36.59
	Meat	69.22
	Canned tuna	1.46
	Beer	46.81
	Honey	0.05
	Maize bran	3.91
	Cotton cake	71.62
	Poultry	43.79
	Batteries	21.27
	Sugar	93.86
	Coffee	12.73
	Ostriches	3.85
	Total	*405.16 ((2.5%)*
Customs related	Wine	39.44
	Electronic equipment	2.4

NTB	Products affected	Value of intra-SADC trade, 2008 US$ million (% of total non-fuel intra-SADC trade)
	Copper concentrate	491.40
	Salt	46.43
	Cosmetics	41.08
	Medicines	232.86
	Total	*853.61 (5.2%)*

Note: Volumes of trade do not reflect those actually affected by NTBs since not all countries in SADC impose all these NTBs. It should simply be interpreted as an indication of how important to regional trade the products affected by these NTBs are.

Sources: Authors' calculations based on complaints made by SADC countries to NTB Monitoring Mechanism and UN Comtrade.

Streamlining NTMs: How Mexico Did It

ALI HADDOU

13.1 INTRODUCTION

Regulatory reform has been a fundamental element of Mexico's transition from a closed to an open market-based economy. The process started in the mid-1980s, when general frustration with macroeconomic instability and years of stagnant growth and inflation in the wake of the 1982 debt crisis led to a change in economic policy, based on three interdependent pillars: trade liberalisation, privatisation and regulatory reform. The change entailed a complete recasting of Mexico's system of regulatory governance.

The progressive trade liberalisation began with a significant unilateral reduction of tariffs and import licences, then continued with Mexico's accession to the GATT in 1986 and the negotiation of free trade agreements (FTAs) with the United States and Canada (1994), the European Union (2000), and Japan (2005), among others. The process went hand in hand with the establishment of new regulatory institutions, tools and processes in order to make the most of opportunities created by the FTAs, and the promotion of the structural reforms – in recently privatised network industries and other areas – needed to boost the productivity and competitiveness of the economy as a whole (Salas, 2005; Córdova and Haddou, 2008).

Regulatory reform and trade liberalisation play complementary roles in that they enhance competition to give consumers and businesses competitive and non-discriminatory access to a wider selection of inputs and final goods in domestic markets; they facilitate international trade to enhance foreign market access for Mexican goods and the entry of capital goods, key inputs and investment on more favourable terms, which expands productive capacity, generates employment and favours the diffusion of new technologies; and they contribute to the development of efficient regulation that reduces the costs of market entry and operation in general.

But each FTA brings with it new rules and administrative processes designed to ensure that goods benefitting from preferential treatment satisfy geographical origin requirements. The complexity and asymmetry of the overall tariff structure that results can produce unwanted consequences, such as:

- *Inefficient trade diversion*. The preferential access for FTA partner goods and services may result in domestic consumers and producers paying more for goods and services than they would otherwise, as a result of the higher tariffs applicable to non-FTA products.

- *Transshipment and fraud to bypass rules of origin requirements*. This risk of rules of origin bypass and the multiplicity of procedures to verify the origin of goods forces customs authorities to invest significant resources in the classification and inspection of goods that might be better applied to other uses. The increased transaction costs raise the prices of all goods, not just those from non-FTA partners.

- *Distortion of incentives in production chains*. Final products often wind up receiving different tariff rate 'protection' than the one resulting from the summation of tariffs on inputs along the production chain. When the equivalent tariff rate on inputs is greater than the nominal rate paid for the final product, the incentives to produce goods locally are reduced and the results are precisely the contrary of those intended.

When a significant proportion of trade is with preferential trading partners – well over 80% in the case of Mexico – the rationality of maintaining such a complex system of trade regulation is naturally put into question (Zabludovsky, 2005). The uniform application of regulatory reform principles (transparency, public consultation, non-discrimination and cost-benefit analysis) to trade-related measures can help.

This paper presents an overview of the parallel chronological evolution of trade and regulatory reform policy in Mexico over the last 20 years, with particular emphasis on the institutional and procedural aspects of the review of trade-related measures (NTMs) and the role of regulatory impact analysis (RIA) in this process.

13.2 UNILATERAL LIBERALISATION AND THE ROAD TO NAFTA: 1989–1994

After Mexico had slashed its tariffs unilaterally in the mid-1980s and joined GATT in 1986, it soon became clear to the incoming administration in 1988 that to integrate Mexico fully into the world economy and to effectively tap into foreign savings, it would need to develop its export markets, accelerate economic reform and form part of a regional trading bloc. Amid preparations for the negotiation of a trade agreement with the United States – and subsequently Canada – an Economic Deregulation Unit (Unidad de Desregulación Económica, or UDE) was created within the trade ministry in 1989 to review the national economic regulatory framework in order to promote competition, economic development and job creation.

The initial round of unilateral tariff reductions in the mid-1980s quickly revealed the inefficiencies of state-owned enterprises that dominated the economy, poor

infrastructure and high entry barriers that resulted in an underperforming private sector.[1] The UDE's response to this was a reform strategy that would make Mexico's regulatory framework compatible with a modern free-market economy, and reduce operating costs across the board to promote competitiveness. The reforms were quickly implemented. Between 1989 and 1992, for example, airlines and telephony were privatised, road haulage was deregulated and private investment – both foreign and domestic – was allowed in road construction, ports and electricity generation.

The UDE's actions implied reducing the discretion and power of many regulatory authorities, and ran counter to a Mexican bureaucratic culture still grappling with its vestiges of corruption and opaqueness. The only way to overcome resistance forcefully was to secure committed political support at the highest level of government. The shift towards actively seeking to improve the business environment and the rule of law required active support from the President to discipline the executive branch and Congress (where the incumbent party still held a strong majority) and allow a small group of economists and lawyers to design and push for the implementation of major reforms. The reforms were carried out in an opportunistic manner, establishing a clear priority for projects with high economic returns and low political costs (Salas, 2004).

On the trade front, while the private sector may have expressed some reservations regarding the scope and speed of tariff reductions, and the even greater changes that would result from NAFTA, top business representatives were given the chance to participate closely in the negotiations. A consultative council composed of major business organisations with an interest in foreign trade called COECE (*Coordinadora de Organismos Empresariales de Comercio Exterior*) was set up, and given the opportunity to comment on the nature of commitments before they were agreed on by the negotiating teams (Ortiz Mena, 2006).[2] In the end, the prospect of having the government return the operation of the economy to private hands was a big enough incentive to participate constructively in the negotiation process (Elizondo Mayer-Serra, 2001).

The negotiators also needed to dispel fears – expressed on both sides of the border – of potential opacity and arbitrariness in regulatory rules affecting foreign trade. COECE was concerned about the openness of US government procurement procedures, protectionism in sensitive goods, and agricultural subsidies. Mexico, with its long history of poorly designed and inconsistently applied regulations, needed to show that its investment environment would be stable and predictable, and that NTMs would not be used as a way to get around the treaty's obligations in sensitive sectors. The UDE stepped in dynamically in 1991–92 to design and promote four modern laws that have been instrumental

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1   Average MFN tariffs were lowered from over 25% in 1982 to approximately 10% in 1987 (source: UNCTAD-TRAINS Database).

2   During the NAFTA negotiations, COECE set up 19 different working groups that frequently met with the ministry of trade's negotiation team, and COECE was always physically present during the negotiations themselves to allow for real time consultation on delicate issues. This created a very strong sense of buy-in and cemented unwavering business sector support for the process.

in the process of guaranteeing effective market access, transparency and legal certainty: the industrial property law, the foreign trade law (specifying, among others, general tariff, NTM, licensing, quota, safeguards and antidumping regulations), the economic competition law (which introduced modern antitrust legislation for the first time in Mexico), and the standards and metrology law (which regulates the establishment of technical rules and standards).

While UDE was set up as a specialised task force to dismantle regulatory bottlenecks to make the most of a more open trade regime, the foreign trade law (*Ley de Comercio Exterior*, or LCE) established a foreign trade commission (*Comisión de Comercio Exterior*, or Cocex) to review and to prepare opinions on all tariffs, safeguards, antidumping duties, rules of origin requirements, and technical standards relevant to foreign trade. The Cocex, which still exists today, is a commission without a permanent structure, comprised of representatives from ministries that most often generate NTMs, the foreign affairs ministry, the Bank of Mexico, and the Federal Competition Commission. Cocex was only given the power to issue non-binding opinions (that weren't made public at the time), but it was significant in that it was the first intragovernmental process designed specifically to promote uniformity in domestic trade-related measures and lessen the probability of regulatory capture. Thus, the tandem of UDE and Cocex would tackle existing regulatory bottlenecks and new NTM proposals to avoid entry barriers and unnecessary restrictions on trade.

The standards and metrology law (*Ley Federal sobre Metrología y Normalización*, or LFMN) created a more open process for the development of new mandatory technical rules (*Normas Oficiales Mexicanas*, or NOMs). The law required the publication of proposed technical rules, and the presentation of cost-benefit analyses to consultative committees composed of public and private sector representatives for review and approval. This was the first time that notice and comment, as well as cost benefit analysis was formally introduced into the Mexican legal system. It completely eliminated the possibility of changing technical rules from one day to the next without giving affected parties an opportunity to comment on the nature and effects of the rules. The process has been improved over the years, but the NOM process was the seed of the regulatory impact assessment process that is in place today.

The NAFTA text eventually incorporated disciplines relating to non-tariff barriers, competition policy, intellectual property protection, foreign investment, and protection for aggrieved investors or exporters via novel dispute settlement procedures. These issues were not typical of trade negotiations at the time, and show to what extent the issues were important to Canada, the US and Mexico (and for future multilateral trade negotiations as well). The NAFTA, more than any other trade agreement, generated effective market access by stimulating mechanisms to promote efficient market structure, and implementing open processes for the development of rules that could affect any of the parties. Mexico gained the added benefit of anchoring its broad economic modernisation programme to a trilateral treaty that would make backtracking very difficult (Tornell and Esquivel, 1995; Kose et al, 2004; Córdova et al, 2009).

13.3 Economic crisis and the systematisation of regulatory reform: 1994–2000

The euphoria generated by NAFTA was short-lived. In 1995, Mexico suffered arguably the worst economic crisis of its modern history. The private sector clamoured for government action that would allow for a rapid recovery and a level playing field for companies facing increased competition in the domestic market as a result of NAFTA entry into force in 1994. With financing completely dried up and domestic consumption anaemic, the government offered a new regulatory reform programme as one of the cornerstones of its industrial policy. In the face of strict fiscal restrictions the new government could hardly accede to the private sector's calls for subsidies, and NAFTA eliminated the possibility of increased tariff protection, so regulatory reform emerged as an effective – and fiscally inexpensive – business facilitation measure that would complement the devaluation of the peso in helping Mexican companies become internationally competitive.3

President Zedillo signed the Agreement for the Deregulation of Economic Activity (*Acuerdo para la Desregulación de la Actividad Económica*, or ADAE) in 1995 to implement the new regulatory reform strategy. Its three main elements were the obligation to catalogue and review all formalities that applied to business; the requirement that all regulatory proposals and their corresponding justifications be sent to the UDE for review; and the creation of an Economic Deregulation Council (*Consejo para la Desregulación Económica*, or CDE) to assist in the identification and review of relevant regulatory reform measures, to supervise implementation by the ministries, and to hold the UDE to account with respect to its mandate.[4] The ADAE completely changed the nature of the regulatory reform programme from one of opportunistic *ad hoc* deregulation to a systematic process of regulatory improvement.

First, it called for a full review of existing formalities prior to including them in a central registry of all business formalities, with a guillotine rule, by which any formality not contained in the registry was deemed automatically void was also applied. This applied not only to formalities relating to *opening* a business, but to *any* formality that could be required of business by any branch of the federal government, from patent application forms to the process for requesting the start of an antidumping investigation.

Second, all regulatory proposals having business impacts – however small – now had to be sent to the UDE for review, along with a technical justification

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3   In contrast, Mexico raised tariffs by 100% after the 1982 financial crisis, and American exports to Mexico fell by half and did not recover for seven years. In 1995, Mexico continued to implement its NAFTA obligations even as it raised tariffs on imports from other countries. As a result, American exports recovered in 18 months and were up nearly 37% by the end of 1996 relative to pre-NAFTA levels, even though Mexican consumption was down 3.3% (source: Office of the United States Trade Representative).

4   The CDE was presided by the minister of commerce and membership included the ministers of finance and labour, the comptroller general, and representatives from business, academia and organised labour.

of the measure. In addition, an amendment to the administrative procedures law (*Ley Federal de Procedimiento Administrativo*, or LFPA) was passed in 1996 to formally require regulatory impact analyses (RIAs) in these cases. Although there was no obligation to make the proposals public, the systematic review by the UDE completely changed the dynamics of federal regulatory decision making. This meant that most NTMs were now subject to full UDE analysis and review before being submitted to Cocex for its opinion. The UDE's reviews were naturally more thorough than Cocex's opinions, because it was staffed by experts completely independent of the ministries proposing the rules. Nevertheless, this process did not apply for fiscal regulation, an important loophole that still exists today and that exempts tariff decisions, safeguards, antidumping duties and customs procedures from the general regulatory reform programme.

Third, the ADAE and the CDE significantly strengthened the UDE's position *vis-à-vis* the rest of the administration, especially with regard to its role in reviewing proposed regulations. The RIA requirement shifted the burden of proof to the ministries proposing regulation, which forced them to make their motivations more transparent. RIAs had to include the general public objectives of their proposals, an explanation of how the alternative proposed would be the least restrictive option, an estimation of costs and benefits, and a description of the resources that would be necessary for effective implementation. The UDE would then review this information and present recommendations to the ministry. If the recommendations were not accepted, the issue would be raised to the CDE to pressure the ministry into compliance.[5] The fact that the UDE itself had to report to the CDE on the effectiveness of the review process at least quarterly meant that there was also quite a bit of pressure on *it* to deliver results.

Alongside the implementation of the RIA process, the UDE remained very active in pushing for major reforms of its own initiative. This included the streamlining of judicial procedures to reduce the number and the duration of commercial trials in the Federal District, the elimination of regulatory restrictions on setting up loan guarantees to ease access to credit, amending the foreign investment law to allow greater participation of neutral foreign capital in restricted sectors, replacing the traditional defined benefit pension scheme with the creation of a system of individual retirement accounts, facilitating mining concession schemes, and the adoption of a new insolvency law. In 1996, the UDE was successful in pushing for the elimination of mandatory affiliation to business associations, and for the elimination of a wide range of sanitary licences except in areas where the cost of imposing such licences was justified by the risks to public health. In 1997, the UDE sponsored amendments to the LFMN that allowed companies to demonstrate compliance with technology-specific technical rules via alternative means (regulating the ends rather than the means), instituted a fast-track procedure for the elimination of rules that do not

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5   A key element of this process was that council members were all ministers or their equivalents, and it is obviously very costly for a minister in terms of time and reputation to appear recurrently before the CDE in order to defend questionable regulatory practices.

impose stricter or technical specifications, and mandated a five-year review and sunset clause for all technical rules.[6]

The UDE used the sense of urgency generated by the economic crisis to its advantage, pushing difficult reforms that might otherwise have failed to generate enough political support. Mexico's response to the crisis was swift and effective, driven in large part by its increased export capacity and the support given by the US Treasury quickly putting together a package of over $50 billion in loan guarantees, neither of which would have been possible without NAFTA (Rubin, 2003).[7]

Nevertheless, there was a strong public backlash as a result of the crisis, fuelled by criticisms of lack of transparency and crony capitalism in the privatisation of state enterprises and other aspects of economic policy. Support for structural reform began to wane significantly in 1997, the year in which the PRI (*Partido Revolucionario Institucional*) lost its majority in Congress for the first time in the 20th century.

Again, the UDE found an opportunity to capitalise on an apparently adverse environment, by shifting the focus away from the deregulation and reform of specific economic sectors to a regulatory agenda of transparency, public consultation and technical analysis for the federal government as a whole. The UDE also realised that the conditions that allowed it to have the success it did during the 1990s, particularly the nearly unconditional support from the President and the trade minister, would probably not last forever. It became keenly aware of the fragility of the regulatory reform process that it had pushed for over a decade. There were a few instances of flagrant non-compliance with the regulatory review process when political pressures overwhelmed the UDE's opposition, and there was mounting and recurrent pressure to tone down or not publicise its opinions, or to expedite the review process. An example of the high risks involved came with the change in legal status of the Federal District, where an incoming administration in 1998 essentially scrapped the reforms that the UDE had promoted in the deregulation of road freight and parking rules.

With the support of the CDE, the UDE designed reforms to the LFPA (2000) to fully institutionalise the regulatory reform programme and set its legal basis in law. The reforms created the Federal Regulatory Improvement Commission (*Comisión Federal de Mejora Regualtoria*, or Cofemer), giving it full technical autonomy to design and implement regulatory reform policy in Mexico. The reforms gave Cofemer full review jurisdiction over NOMs, government social security regulation, and also public procurement, that had been important loopholes in the past, although fiscal regulations affecting foreign trade were still outside its jurisdiction and could only be reviewed by Cocex. In line with

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6   NOMs are automatically repealed if the five-year review is not carried out.

7   Following Mexico's 1982 financial crisis, Mexican output drifted down for nearly two years before rising again and did not recover to pre-crisis levels for five years. Although Mexican economic output dropped more quickly in 1995, it also rebounded more quickly, reaching pre-crisis peaks by the end of 1996. Similarly, following the 1982 crisis, it took Mexico seven years to return to international capital markets, while in 1995, it took seven months.

the UDE's practice, Cofemer's powers included the review of regulations, the diagnosis of their application, and the ability to propose reforms in specific areas or economic sectors directly to the President. The programme consisted in four main actions: the deregulation of formalities, the review of regulatory proposals and their RIAs, the drafting of studies and reform proposals upon its own initiative, and the support for regulatory reform efforts at the state and municipal level. The reforms maintained a Federal Council for Regulatory Improvement (*Consejo Federal para la Mejora Regulatoria*, or CFMR), similar to the CDE, but with the addition of consumer-oriented bodies such as the consumer protection agency (*Procuraduría Federal del Consumidor*, or Profeco) and the Federal Competition Commission (*Comisión Federal de Competencia*, or CFC).

RIA was further strengthened by the 2000 reforms, by setting the regulatory review process in law for all regulations, including full transparency of proposals and RIAs and a minimum period of public consultation of 30 days. As of the date of those amendments, no regulation could be published in the official government gazette without having passed through the open regulatory reform process, with severe penalties for non-compliance.8 The amendments were unanimously approved by Congress, in spite of some acrimony between political parties, showing clearly that there was still appetite for 'horizontal' reforms that enhanced predictability and transparency, and that kept the executive branch regulatory machinery in check. This profoundly changed the way of regulating in Mexico.

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8   Up to dismissal and a one-year suspension from public service.

Box 13.1 *The Mexican Regulatory Impact Assessment process*

Institutional design

Cofemer's RIA programme was consolidated and detailed in reforms to the Administrative Procedures Act in 2000, which were greatly influenced by the UDE's five years of experience in the review of regulations and international best practices. The main aspects of the programme were:

- The Presidential appointment of Cofemer's head and the granting of technical autonomy to the institution.
- The creation of the Federal Council for Regulatory Improvement as a means of ensuring Cofemer's accountability and giving the business, labour and academic sectors an important role in the direction of the reform programme's work programme.
- Requiring each ministry and regulatory agency to name a vice-minister in charge of coordinating in-house regulatory reform efforts, and of submitting two-year work programmes to Cofemer for review and public comment.
- Implementing a detailed RIA review process and mandatory minimum 30-day period of public comment for all regulations. Cofemer can question and require more detailed analysis of RIAs within ten working days of submission, and has 30 working days to issue its opinion on the proposal itself. Ministries and agencies must publicly respond to all Cofemer comments and suggestions.

Guidance

To enhance transparency and to provide guidance on how to conduct RIAs, Cofemer developed an electronic platform that allowed for the centralisation of communication between Cofemer and the vice-ministry in charge of regulatory reform in each institution, easy access to technical reference materials, and prompt publication of relevant consultation documents. The online RIA template includes sections on:

- The description of the regulatory action, identifying the nature of the problem and risks that each proposal seeks to address.
- Legal analysis, including a clear review of powers, and compatibility with the existing regulatory framework.
- The alternatives considered (both regulatory and non-regulatory), and an explanation of how the proposal is considered to be the least intrusive option to attain the stated goals.
- The implementation strategy and the consideration of resources necessary to ensure proper compliance and supervision.
- The quantifiable and non-quantifiable costs and benefits of the proposal. In addition to requiring explicit consideration of effects on market competition, domestic and international trade, small and medium size enterprises, and consumer access to goods and services, all relevant capital, operation and transaction costs, and effects on health, safety and the environment must be itemised.

Training

The quality and usefulness of RIA depends crucially on the capacities of the staff entrusted with it, on the quality of Cofemer's review, and on its integration into the decision-making process of each ministry or regulatory agency. Cofemer has invested heavily in training programmes for officials involved in the process. From 2000 to 2006, for example, more than 50 training sessions were set up for well over 2,000 government staff. These included guidance on the content and timing of RIA and the development of case studies and hypothetical examples. While the hiring of external consultants was necessary for some very high impact regulatory decisions, for the most part Cofemer encourages analysis to be carried out in-house in parallel to the development of the regulatory proposal itself. This allows for key RIA decision-making criteria to be considered and internalised when it is easiest to incorporate them into the regulatory process, rather than at the end as a mere formality that is undertaken as a mere *ex post* justification of decisions already taken. The fact that Cofemer used to evaluate and publish the relative quality of different ministries' RIAs was also useful in pushing for greater quality in RIA development.

Cofemer's review

Cofemer's review of RIA is a crucial part of this process. It has ten working days to comment on and to request more detailed or precise analysis of specific issues. Regulators must then incorporate recommendations or respond to comments before Cofemer can issue an opinion on the regulatory proposal itself within 30 working days of the submission of the final version of the RIA. It is at this stage that Cofemer can first and most effectively challenge key aspects of a regulatory proposal. If a questionable regulatory strategy is insufficiently justified, Cofemer can ask for more detailed analysis of the motivations for pursuing it and of the potential effects it might have. In fact, Cofemer often sits informally with the proponents of the regulation to discuss alternative regulatory scenarios and their likely outcomes in order to eventually arrive at a more efficient and precompetitive regulation solution to the problems identified. In this sense, the technical quality of the analysis of potential effects is not as important as the identification of the key decision points. Prospective analysis of potential effects is an inherently difficult task and it is often much more productive to focus on key regulatory actions and to evaluate if they conform to basic regulatory quality criteria (such as adoption of least restrictive regulatory options and international best practice, avoidance of unnecessary barriers to entry, minimisation of paperwork burden and supervision and inspection costs, etc). When analysing RIA, the identification of flawed reasoning and exaggeration of potential benefits of poor regulatory strategies is one of the most effective ways of exposing weaknesses in regulatory design, and of keeping agencies from issuing ineffective regulations that run contrary to the public interest.

13.4 THE GROWING REGULATORY COMPLEXITY OF FOREIGN TRADE: 2000–2005

By the turn of the century, it was clear that the Mexican economy was facing some very serious structural problems.[9] There seemed to be a general consensus regarding the need for important reforms in energy, telecommunications, labour and fiscal policy, but the political climate made it difficult to make major changes to sector-specific regulatory policy.[10] In spite of the changes in the political landscape, Cofemer maintained and even increased its public visibility during this period. Horizontal reforms for increasing the transparency and accountability of government remained feasible. In response to this trend, Cofemer drafted another groundbreaking legislation, the transparency and freedom of information law that was approved by Congress in 2002.

Cofemer also prepared a set of regulatory reform proposals in natural gas, road haulage,[11] water and environmental regulation that did not fare as well in the political process. Cofemer was also one of the first institutions to point out the need for a detailed review of customs regulations and procedures to better meet the needs of exporting and import firms, despite the fact that it does not have jurisdiction over tariff and customs matters, only over technical standards and administrative rules pertaining to access to certain foreign trade programmes. Among some of the issues Cofemer pointed to was the increase in border crossing times and bureaucratic formalities that were beginning to seriously burden Mexico's trade competitiveness.[12] For example, the growth of customs brokers, which hold a monopoly on the processing of foreign trade transactions, did not keep pace with the growth in trade volume in the 1990s, and has remained stable for the last decade, and in 2000 the trade ministry was handling foreign trade regulations and formalities with the same budget it had ten years earlier.

Box 13.2 *Review of courier services rules*

Ever since the enactment of the Law on Road, Bridges and Road Transport in 1993, the regulation of road haulage and courier services has been a hotly debated topic, mainly due to the fact that road haulage is an activity reserved for Mexican nationals, while courier services are completely open to foreign investment. The law called for the development of implementing rules for courier services within 6 months of the law's entry into force. It was not until 2011, however, that these implementing rules were finally issued, with Cofemer playing an important role in the process.

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9   The success of the structural reform programme and growing international confidence in Mexico clearly show in the foreign investment data that jump from just over \$4 billion in 1993 to a peak of nearly \$30 billion in 2001. But the data also show a prolonged period of stagnation in FDI inflows since 2000. The data also show us a clear trend of falling market share in the North American market and a general decline in GDP growth rates beginning in 2001. Cuevas *et al* (2002) link the growth slowdown in Mexico in part to the halt of economic reforms.

10 Eventually limited energy and fiscal reforms were approved in 2008.

11 For an overview of some of the issues discussed in the road haulage sector, see Box 13.2.

12 Soloaga *et al* (2006) estimated that unilateral trade facilitation in Mexico could lead to increases of 20% for exports and 11% for imports.

The law rather vaguely defined courier services as those approved by the Ministry of Communications and Transport (SCT) according to the criteria specified in the implementing rules. As for the packages themselves, the only characteristics specified were that they were to be properly wrapped and labelled (*envueltos y rotulados*) and accompanied by a shipping guide.

Road haulage companies are a rather combative interest group and they expressed their concerns regarding 'unfair competition' from courier services infringing on their turf. Tensions in the sector were exacerbated by the fact that NAFTA called for the complete opening of North American road haulage services in 1994, but was postponed for political reasons until 2011. Road haulage companies therefore argued that courier companies were competing unfairly in road haulage (since foreign companies were prohibited from providing the service) and that they were not being granted access to the US market as a result of NAFTA obligations not being honoured.[13]

Through the Cofemer review process, road haulage companies argued for limits on the gross weight of trucks for courier services and for maximum size and weight limits on the packages they could transport. Courier companies argued that the limits on truck and package dimensions would unnecessarily limit their competitiveness, and that the limits would serve no safety purpose, which is what SCT should focus on. The RIA prepared by SCT distilled the arguments in support of the proposed implementing rules, and revealed certain bias towards creating entry barriers that favoured domestic companies. The initial proposal was that gross truck weight for courier services should not exceed 9 tons and that packages should not exceed 50 kg, and included an implied authorisation of routes. The courier companies argued that there should be no specific regulation for truck size or weight and that package limits should be set at no lower than 70 kg. Bus companies would be allowed to offer courier services, while road haulage companies would not.

The RIA presented only general information on the size and composition of the cargo and courier fleets, and on the number of people working in the sector and so forth, but relatively little on the effects that the rules would have on them. Only some direct costs were quantified, and benefits were limited to stating that the measure would attract foreign investment and increase legal certainty. The justification for truck size limits was to enable authorities to visually distinguish courier from cargo trucks. Package size and weight limits were based on the argument that heavy packages were a health risk for courier employees. Cofemer's opinion made reference to the Federal Competition Commission's (CFC) vehement criticism of the unnecessary barriers to entry contained in the proposal, and in response SCT raised the truck gross weight limit to 11 tons (respecting the size and weight of courier trucks currently in use), and eliminated package restrictions altogether.

Finally a compromise was reached in that bus companies and cargo companies would be allowed to provide courier services, all route authorisations would be eliminated, maximum truck weight was raised to 11 tons and package weights were limited to 31.5 kg. Though the outcome was not as procompetitive as Cofemer and the CFC may have desired, the adamancy with which the Cofemer opposed the original proposal helped

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13 Fox *et al* (2003) estimate welfare losses of $3.2 billion derived from the US–Mexico trucking dispute.

avert a more anticompetitive regulation from being issued. Though costs and benefits were never properly quantified, RIA played a key role in making the bias inherent in the proposal clearly visible, and it raised the public cost to SCT for not conforming to Cofemer's regulatory principles.

While COECE continued supporting free trade, the rival Mexican Foreign Trade Council (*Consejo Mexicano de Comercio Exterior*, or COMCE) openly called for a moratorium on new FTA negotiations during these years, which the government formally established in late 2003, as the FTA negotiations with Japan were coming to a close. COMCE also spearheaded the calls for an increased focus on 'national competitiveness', rather than foreign trade, which eventually led to the creation of the Mexican Institute for Competitiveness (*Instituto Mexicano para la Competitividad*, or IMCO) in 2003.[14] The government again called for the politically expedient deregulation of formalities, and Cofemer responded by completing the RFTS and identifying a list of over 60 high-impact formalities for immediate improvement. The Office of the President and the ministry of public administration (*Secretaría de la Función Pública*, or SFP) assisted in the implementation of this project by extending it to customs regulation and setting up working groups with business representatives to agree on a set of presidential commitments of formalities improvement. Some relevant measures were adopted through this process, most notably the elimination of business associations' approval of the inscription in the national importers registry.[15]

The negotiations excluded the CFMR, however, which never really recovered the influence it once had in the regulatory improvement programme.[16] Since then, regulatory improvement has been led in large part by the SFP. Given that the minister of public administration operates at the leisure of the president, it is much more exposed to political pressures than Cofemer. This does not mean that it does poor work, but it is not subject to the same mandate, nor the accountability mechanisms, as the CFMR. The reduction and elimination of information requests and the increased use of information technology that SFP focuses on are important from an administrative development standpoint, but they are not the essence of building an effective regulatory governance system.[17]

The relevance of promoting good regulatory governance rather than administrative simplification is clear. The design of policies, institutions, processes tools and evaluation of regulatory outcomes is beyond the legal

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14 IMCO eventually published a very influential 2004 report on competitiveness that includes an in-depth analysis of foreign trade regulation.

15 Until then, incumbent business associations could oppose the inclusion of new competing companies in the national import registry, without which it was impossible to import goods into Mexico.

16 The meetings of the CMFR turned into public presentations of Cofemer's activities, without much scrutiny or analysis of individual ministries' activities. It has not held a single meeting during 2006–2010.

17 For instance, SFP has traditionally been worried about the establishment of national preferences in public procurement in order to 'promote national interests'.

scope and abilities of the SFP, but they are the essence of Cofemer's mandate. In addition, given that one of the main obstacles to the creation of efficient regulatory systems has been the problem of regulatory capture by political or business interests, it is at the very least questionable to put the process in the hands of a government ministry instead of an autonomous institution with the necessary accountability mechanisms to avoid the problem of capture.

Without strong support of the CFMR – or the president – however, Cofemer lacks the power and independence to convince or compel agencies into compliance with the regulatory reform programme. To put it bluntly, if the head of Cofemer is too aggressive in pushing issues considered damaging to the interests of the political party in power, he can quickly be replaced by someone more malleable. Since 2005, therefore, its role has been largely relegated to promoting formalities deregulation, the diffusion of regulatory reform programmes at the state and local level, and ensuring opportunities for public comment on regulatory proposals. These programmes are relevant, but Cofemer is no longer the epicenter for structural change that it once was.

Despite these obstacles, Cofemer devoted itself from the outset to consolidating the regulatory reform, including the continued development of RIA (see Box 13.1), and the launching of a state-of-the-art electronic submission platform that not only set a common template for the presentation of data and results, but also enormously facilitated public consultation and comment on regulatory proposals.[18] This activity, although more relevant because it addresses the underlying regulatory problems that generate poorly designed formalities, did not draw as much attention. And yet, it is probably the most enduring action Cofemer has implemented in the last decade, along with the freedom of information law. Indeed, it is through the review of the RIAs for the rules for the administration of preferential import tariffs programmes and of agricultural import quotas that the issues of regulatory complexity and potential discrimination first became of interest to Cofemer.

Eventually, several relevant institutions prepared detailed reviews and analysis of customs and foreign trade regulatory policy, including IMCO (2005), the CFC (2008), and the vice-ministry for standards and foreign trade services. The latter commissioned a detailed study on the impact of foreign trade regulation on competitiveness in 2004, which would later be influential in the policy shift that took place after 2006 (Bracho *et al*, 2005).

If there was any doubt in 2000 that Mexico's asymmetric tariff structure, combined with the administration of selective tariff preferences, countervailing duties, rules of origin requirements and border inspection of NOMs were creating high costs for importers and users of foreign inputs, by 2006 those were completely dispelled. Clearly, the benefits of preferential access to the US market were being eroded by the gradual lowering of MFN tariffs and diverse

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18 Before the electronic RIA platform, only the titles of regulatory proposals were published once a month in the official gazette. Interested parties would then have to go to Cofemer to ask for a copy, which left little opportunity to comment effectively and within the review times stipulated by the LFPA.

arrangements for preferential access to the US market. Regulatory and logistical problems were damaging the other main contributor to Mexico's comparative advantage, its geographical proximity to the US. China, generally seen as a direct competitor of Mexico's in international markets, had begun its vertiginous export growth, and Mexico was going to have to face the effects of its dwindling advantage as a location with intermediate wages and technological sophistication for certain key industries. China replacing Mexico as the number two exporter to the US confirmed many of the fears.[19]

Cofemer's growing concern was that foreign trade regulation and processing was beginning to have a large impact on Mexico's competitiveness. The diversity of regulatory requirements to obtain the preferential FTA benefits under the agreements were becoming increasingly complex (rules of origin accreditation was often, and still is, named as one of importers' major obstacles). Mexico also needed to improve its trade processing capacity, both regulatory and logistical, to take full advantage of its proximity to the US market, particularly in light of the emergence of East Asia as an important provider of industrial inputs.

By the year 2000, 90% of Mexico's trade was being conducted with its FTA partners, and roughly 80% with the US alone. However, Mexico has been known to selectively raise tariffs to non-FTA countries in response to political pressures, and its MFN tariff levels have been quite high. In fact, Mexico actually increased MFN tariffs quite significantly as recently as 1999.

High average MFN tariffs and very low preferential FTA tariffs made Mexico's tariff structure very complex. This became a problem for many important manufacturing industries that depended on low cost inputs and machinery from non-FTA countries. In response, the government designed programmes like the *Programas Sectoriales* (Prosec) in 2001, which essentially granted North American tariff preferences for non-originating inputs used in the production of exports. Prosecs were created for industries such as chemicals, footwear, steel, autos, textiles and electronics, which benefitted from a 10 to 15% tariff reduction on imports under the programme. Programmes like these amount to an export subsidy and were scrutinised by Cofemer because of their discriminatory nature.

Mexico also became a frequent user of antidumping measures, applying more than 90 countervailing duties, which affected nearly 1,400 tariff lines in 2002. The majority of these duties exceeded 200% and many were well over 500%.[20] With such a huge disparity in duties, the incentives to evade them and to transship goods through the US or incur in other forms of contraband were significant. It was estimated that the amount of contraband goods sold in street markets ranged from 50 to 90% for clothing, music, software, cigars and footwear (Bracho et al, 2005).

Finally there is the case of NOMs. These technical rules are generally applied in a non-discriminatory fashion throughout Mexico. However, because of the purported difficulty of identifying someone responsible for compliance in the

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19 These concerns led Mexico to be the last country in accepting China's membership in the WTO.
20 Source: WTO Trade Policy Reviews of Mexico.

case of imported goods, many NOMs are verified at the border. This creates two significant problems. First, it implies a complicated coordination issue between customs officials, responsible ministries, and private conformity assessment bodies, which can generate costs and delays. Second, these procedures have been used as a way of containing imports in defence of certain products and industries. The proportion of tariff lines subject to border inspection of NOM standards is as high as 70 to 90% in the case of food, textiles and footwear. The inherently discriminatory nature of border conformity assessment procedures was also a common theme of Cofemer's opinions (see Box 13.3).[21]

Box 13.3 *Review of food labelling standards*

The 1996 mandatory technical standard on food labelling in Mexico was a contentious trade-related measure that had been the subject of much debate for the better part of 10 years. The standard mandates the labelling of nutritional content and consumer information for most packaged foods in Mexico, but did not until recently conform to the international standard set by Codex.

Foreign imports were subject to *ex ante* and sometimes discretional conformity assessment procedures at the border, where their products were sometimes immobilised for containing additional information or health claims not covered by the standard. Domestic interests were mostly content with the fact the standard acted as a trade barrier that obstructed access to foreign goods. The government was dissatisfied with the fact that the regulation did not appear to be efficiently achieving its stated health goals. The complaints and defences of the standard were, for the better part of a decade, generally unorganised and led to sterile discussions that did not produce any concrete outcomes.

Finally, in 2008 a number of factors came into play to push for the review of the standard that eventually led to its modification and harmonisation with international standards. The first has to do with a Cofemer sponsored reform to the Federal Standards and Metrology Law in 1997 that required a five-year review and automatic sunsetting clause of technical standards, and a default requirement of harmonisation with international standards. Upon the date of the second five-year review date in 2008, importers made it clear that the standard was obsolete and out of line with international standards. The second major factor was that the government was pushing for a major campaign against obesity and wanted to ensure that the standard was generating useful consumer health information in line with the government policy.

A review and RIA of the standard was initiated as a combined effort of the Economics Ministry and Federal Commission for the Protection Against Sanitary Risks (Cofepris). The first advantage of the RIA was that it clearly stated which issues were to be reviewed (consumer identification of health risks, clarification of information and health claims to

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21 Econometric studies have documented the increase of production costs due to standards and how they may constitute technical barriers to trade (Maskus *et al*, 2004). Recently, the Mexican Federal Competition Commission has also actively promoted the competition screening of NOMs (Conrath, 2009) to help avoid such problems.

be included in labels, harmonisation with international standards, compliance costs and conformity assessment procedures), which helped enormously in ordering the discussion. During the time where the regulatory process was opaque, the government had little incentive to confront protectionist interests and the inefficient aspects of the standard were never really publicly debated. The mandatory public five-year review allowed parties interested in modifying the standard to be heard and to push for harmonisation. Once the review process was opened, everyone had an equal opportunity to publicly present their views.

The RIA also shifted the debate towards a more technical discussion. The government was forced to present credible studies and data regarding the incidence and effects of health claims, and the importance of reliable nutritional information. It also began to present trade facilitation arguments as an additional benefit to consumers, thanks to the involvement of the trade areas of the Economy Ministry. The business sector opposed to harmonisation had to present reasonable arguments against changing the standards, and could no longer rely on directly lobbying the government on protectionist grounds. It focused therefore on the potential compliance costs of the regulatory change derived from the large inventories that would be 'caught' in non-compliance. Importers presented information regarding the costs due to uncertainty of the rules themselves and regarding the discriminatory nature of at-the-border inspections, rather than regular 'retail shelf inspections' like those domestic manufacturers were subject to.

Although the quality of the data presented was certainly not immune from criticism of bias, and one cannot say that the estimation of compliance costs was entirely satisfactory, the mere presentation of legitimate issues rather than backdoor lobbying was enormously helpful in shaping the debate. Because the default position required by law is one of harmonisation with international standards, the Codex standard was used as a model, and it proved impossible for opposing parties to discredit it or allege that domestic conditions in Mexico were different. The principles of harmonisation and non-discrimination of foreign products were agreed upon, and all that was left was to attend to the stranded inventories argument. This issue was resolved by incorporating a gradual implementation of the new obligations over one full year. This was sufficient to overcome business and conformity assessment bodies' opposition to the changes and the new standard was published in February 2010.

The problem of the illegality spawned by this complex system is compounded by the fact that it has led to a number of measures designed to combat the problems, which paradoxically make it even more complex, creating not only the possibility of corruption, but also creating new incentives to evade regulation. Outright pressure to protect certain industries was also a clear problem, as evidenced by importers summarily eliminated from the import registry and the increase in customs embargos by over 600% from 2000 to 2004 (Bracho *et al*, 2005).

All of the aforementioned measures and others such as the general and sectorial registries of importers, exclusive custom entry points for certain goods, and estimated prices, can be attributed to one of three causes: (1) the complexity

of foreign trade regulation; (2) the need to combat fraud and enforce the law; or (3) pressure to protect certain sectors.

Unfortunately, the result of all this has been the erosion of two of the main factors that contribute to Mexico's comparative advantage: the preferential access to the US market because of NAFTA, and the geographic proximity to the US. According to one study, an average US to Mexico border crossing could take two to five days and cost between 1.5 and 6% of the merchandise in question, while in the other direction it would only take between 1.5 and 13 hours and cost only 0.5 to 2.6% of the merchandise value (Hummels, 2001). Other studies confirm a clear dampening effect of NTMs on the welfare effect of tariff reductions (Anderson and van Wincoop, 2001), and a 'border effect' nearly an order of magnitude greater in US–Mexico prices versus US–Canadian prices (Rogers and Smith, 2001).

13.5 UNILATERAL TRADE OPENING AND APPLICATION OF REGULATORY REFORM PRINCIPLES TO TRADE RELATED MEASURES: 2006–2011

The dwindling preferential access to the US market, the rise of China and other nations as exporting powers and direct competitors of Mexico in world markets pointed to the need for moving to higher value-added products and exploiting the geographical proximity to the US as effective policy options. An effective way of contributing to this is by reducing the complexity of foreign trade regulation by applying simple regulatory reform principles to promote entrepreneurship and allowing greater industry flexibility, and business competitiveness.22

The first major steps were taken in 2006. The trade ministry reduced MFN rates of over 6,000 tariff lines of inputs and raw materials (especially in textiles, chemicals and ore) relevant for 18 sectors in which tariff heterogeneity was high and where the cumulative tariff rates on inputs was higher than for the finished goods, which obviously reduced incentives to produce in Mexico. The move taken at the end of the Fox administration was a major shift in policy and did not generate as much opposition as might have been expected.

The process continued under the Calderón administration. In 2008, Mexico pushed the process of unilateral market opening further, based on a general reduction of MFN tariff levels, the simplification of exceptions and customs procedures, and the strengthening of Cocex's institutional design.

The economy ministry reduced industrial MFN tariff levels from 10.4% in 2008 to 5.3% in 2010 and they are scheduled to be reduced further, to 4.3% by 2013. The number of duty-free tariff lines was also increased from 20% in 2008 to 63% in 2010, meaning that over 90% of imports now enter Mexico duty-free. To address the complicated administrative structure of granting duty-free access to inputs and machinery for certain industries, the preferential treatment granted under programmes such as Prosec are being extended to all, eliminating

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22 For a description of how Asian competition has spurred the impetus for reform in Mexico see Ibarra-Yúnez (2004).

discriminatory effects. Prosec preferences applied to 4,800 tariff lines will be completely eliminated by 2013 (down to 1,300 already in 2010). Quotas are being changed to tariffs in the case of textiles, and auctioned for sugar and toys (another frequent Cofemer recommendation). NOM conformity assessment procedures – which regulate over 3,700 internationally traded products and services – are being reviewed, and now nearly 60% of the value of Mexican imports enter free of non-tariff regulation (Martínez Trigueros, 2010a).

Mexico also formally recognised the equivalence between Canadian, US and Mexican safety standards for household appliances and business electronic equipment. The decree accepts certification of compliance with North American standards for commercialisation of products in Mexico. Certification bodies and laboratories in Mexico were opposed to the measure, but in the end, the major business associations agreed to it, since it would reduce unnecessary certification procedures. The government did not consult formally with the private sector through the usual Cofemer procedure, however. The LFPA allows for an exemption of RIA for rule changes that are judged to reduce compliance costs, and of public consultation procedures in cases where the publicity is deemed to compromise the effects of the regulation. The fear was that the issue would stir up controversy or court actions that would eventually halt the process. Experience has shown, however, that it is usually better to treat all arguments on their merits and give assurances that all public concerns have been properly addressed. Nevertheless, the measure is a positive one.

The same measure was taken for medical devices in October 2010 by health officials (*Comisión Federal para la Protección contra Riesgos Sanitarios*, or Cofepris) to expedite access to safe and effective medical devices that comply with North American standards, an issue had been raised in Cofemer recommendations since the year 2000.

These decisions represent an important policy shift in practice, because traditionally the Mexican government had sought to promote harmonisation (convergence of standards) or mutual recognition of conformity assessment procedures, rather than outright recognition of foreign certification. Laboratories and conformity assessment bodies were obviously against the measure, because equivalence eliminates the need for Mexican certification for imports, but the gains from avoiding unnecessary delays and testing costs which negatively affected the availability of goods and prices for consumers sufficed to overcome domestic resistance.

On the customs administration side, the work with business associations has led to the elimination of the sectorial import registries, the burdensome requirement of having to identify and label individual units of goods at the border, and the posting of bonds in the case of goods that were subject to estimated pricing rules. A one-stop shop project for customs and foreign trade regulation – similar to Cofemer's system for rapid business registration in design – is also being

implemented.[23] All ministries' regulations that need to be enforced by customs authorities will be included in a single portal for foreign trade formalities, and direct access will be granted to the private sector (not only customs brokers, but also trade advisors and shipping companies).

Cocex will be strengthened by making its comments open and public (including resolutions, opinions and reports), and requiring its opinion before any non-tariff measure can be published in the official gazette and effectively applied.

Rules of origin requirements are now more uniform. Negotiations for the accumulation of rules of origin in textiles for Mexico and Central American nations, as well as with the Dominican Republic and the US, have been concluded to support the competitiveness of the textile industry at the regional level and of Mexican exports in particular. The agreements make it easier for producers to draw on the participating countries for their supplies at preferential tariff levels, thereby allowing the finished products to acquire originating status.

Finally, Mexico and China entered into an agreement in 2008 that obligates Mexico to repeal a large number of antidumping duties in areas such as textiles, apparel, footwear, toys, bicycles, tools, chemical products, valves, and locks, by 2011. To minimise opposition to the agreement, reconversion funds have been approved by Congress.

13.6 Conclusions

Trade policy is a central element of regulatory governance. Greater openness to foreign trade enhances competition, expands productive capacity, and benefits consumers in domestic markets. It also generates better regulation by providing the incentives to reduce transaction costs, improve transparency, predictability and legal certainty. In the vast majority of cases, tariff cuts are regulatory improvements in and of themselves because they reduce barriers to entry and competition, and improve the diversity, quality and prices of goods offered. Trade facilitation should be the sole objective of trade policy, and the creation of barriers, either in the way of tariffs or NTMs, should occur only on the basis that the benefits of doing so would outweigh the costs to society as a whole. To achieve this, trade policy should also be subject to regulatory reform principles and review in general.

It is important to be clear about the objectives of trade policy and their relative prioritisation. This is a primary responsibility of the trade ministry, naturally, but the coordination with authorities responsible for regulatory NTMs, and of course with customs administration is essential to clarify the overall direction of government policy. Specifically, Mexico's experience shows that the following measures could lead to more efficient regulation of trade:

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23 The *Sistema de Apertura Rápida de Empresa*s (SARE) created by Cofemer, which led to an improvement in the IFC/World Bank Doing Business rankings for Mexico (World Bank, 2009).

- *Review of tariff structure*. Reducing fiscal burden, eliminating contradictions and reducing tariff dispersion should all be central goals. In the case of Mexico, this meant switching from a bilateral trade negotiation strategy based on reciprocal concessions, back to a unilateral trade liberalisation strategy. Ideally, tariff reduction schedules in different FTAs should try to be accelerated and synchronised. The process should be accompanied by a parallel reduction and eventual elimination of preference programmes such as Mexico's Prosecs.

- *Establishment of full regulatory reform disciplines for all trade-related measures.* Mexico's experience illustrates the importance of including trade issues under the fold of a government-wide regulatory improvement programme. The fact that tariffs and customs regulations were not reviewed by Cofemer because of its lack of jurisdiction over fiscal issues, probably meant that they were more susceptible to capture than other forms of regulation, which may be part of the reason for which it took the government the better part of a decade to attack the issue of the complexity of trade regulation in a coordinated way. Transparency, public comment and technical justification are needed in the case of trade-related measures just as for any other sort of regulation. Cocex was an early regulatory reform-type body for tariff and NTM regulation, and is useful as an intragovernmental discussion forum, but it lacked the transparency, staff and power to contest actions proposed by powerful ministries. The recent measures making its opinions public are a step in the right direction, but it is still far from regulatory best practice.

- *Continuous review of the impact of regulation on foreign trade and competitiveness*. Regulatory impact analysis of NTMs and regulatory proposals in general should be applied both *ex ante* and *ex post* to ensure proper design, to correct assessment of benefits and cost (effects not only on government revenue, but also on the volume of trade, consumers, business competitiveness, employment, competition and social objectives) and to quickly identify ways of improving the regulatory environment. RIA in Mexico explicitly requires consideration of trade effects by all regulation submitted to Cofemer, but *ex post* review is still rare. Mexico could have benefited from a much earlier response to accumulating NTM barriers to trade.

- *Coordination and evaluation of trade policy and its regulation.* A central body should be entrusted with the overall design and implementation of policy, and the coordination of all of the different agencies involved. The goal should be to reach consensus with regard to the objectives and use of instruments of trade policy, and to periodically and transparently evaluate its effectiveness with respect to pre-established parameters. This would help in conferring a clear common vision to trade policy and

to reduce the occurrence of *ad hoc* regulatory reactions to protectionist pressures and special interests. The government should also engage business, the legislative branch and consumer groups to clearly communicate the contributions of regulatory reform of trade measures to competitiveness and social welfare.

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14

Regulatory Impact and Cost-Benefit Analyses – Tools to Evaluate Regulatory Quality and Improve Transparency among Countries

Sílvia Helena G de Miranda

14.1 Outline

Regulatory impact analysis (RIA) is a tool that has been adopted by several countries as part of a policy to improve their regulatory quality, providing more legitimacy to regulations and reducing conflicts between government agencies and private sectors. When a country implements an *ex-ante* or *ex-post* evaluation of public policies this gives more room to involve private agents in participating in the regulatory process, making them aware of it since the conception of a new policy or programme proposed by public agencies until the monitoring of its consequences. In RIA's scope, one of the main analytical techniques used is cost-benefit analysis (CBA).

In Brazil, some governmental agencies are currently implementing RIA, aiming at having a common and quite harmonised methodology. For achieving such a goal, those agencies have been providing capacity building programmes to their staff. The Casa Civil, which is a branch of the Republic Presidency, with a ministry status, and which aims at assisting and advising directly and immediately the President, is in charge of a programme, the PRO-REG (*Programa de Fortalecimento da Capacidade Institucional para a Gestão em Regulação*[1]), which is focused on promoting and implementing RIA in Brazilian regulatory agencies, and is also supported by the International Development Bank (IDB). Several agencies are taking part in this initiative, although there are other individual programmes taking place in Brazil, also having RIA implementation as a target. That is the case of INMETRO's (the National Institute of Metrology, Standardization and Industry Quality) programme to apply RIA to conformity assessment programmes. PRO-REG and the Analysis of Technical

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[1]   In English, literally, Programme to Strengthen the Institutional Capacity for Regulatory Management. More information can be found at *http://www.regulacao.gov.br/*.

and Economic Viability conducted by the Directory of Quality from INMETRO are two examples to be highlighted in this new regulatory environment that has taken place in Brazil recently.

As far as the sanitary policy is concerned, a Brazilian institution, which is focused on promoting research, the CNPq – *Conselho Nacional para o Desenvolvimento Científico e Tecnológico*[2] – sponsored a large project regarding agriculture and cattle health and safety, particularly focused on evaluating the current Brazilian system of Sanitary Defence, which involves universities, agencies and private companies in a broad discussion to build up a diagnosis of major problems and priorities to be worked on, and to identify opportunities to improve the sanitary and phytosanitary safety services. Likewise, this project has also aimed at constituting a network of experts in such a way as to enhance the dissemination of technical and scientific information and promote a broader discussion of themes of interest in this field. This effort to build up a network of experts and officials and other stakeholders resulted in the creation of the RIT-DA (*Rede de Inovação Tecnológica – Defesa Agropecuária*[3]). One of the studies supported by this project deals with proposing a methodology to evaluate the relation between costs and benefits of sanitary programmes and policy in agriculture and livestock sectors, conducted by governmental agencies and departments, especially those related to prevention, control and eradication of exotic pests. This is one of the cases that will be presented in the following pages.

Those cases mentioned above indicate that the Brazilian government, either through direct administration or through research and development institutions, is sensitive to improving transparence in its regulatory actions and is searching for analytical tools to give more support to policymakers and to establish priorities in terms of regulation and budget allocation. Moreover, such developments in terms of RIA (both applying to *ex-post* or *ex-ante* regulations) consist of important sources of data and information for other sectors of the economy also, not necessarily directly involved in the sanitary and phytosanitary issues. These points will be detailed later.

As a country or agency implements RIA, besides providing more transparency for government decisions, an additional benefit may derive from having the very detailed technical and legal dossiers available for other uses, and containing important information regarding specific programmes, regulations or rules analysed. RIA's documentation usually comprises not only the quantitative results of cost-benefit analysis and cost-effectiveness analysis, but also qualitative information about environmental and social impacts expected from the object analysed. Additionally, these reports usually include a legal and technical

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2 'The National Council for Scientific and Technological Development (CNPq) is an agency linked to the Ministry of Science and Technology (MCT), dedicated to the promotion of scientific and technological research and to the formation of human resources for research in the country' (available at: *http://cnpq.br/english/cnpq/index.htm*).

3 Literally, Network for Technological Innovation in Agriculture and Livestock Safety.

background section that should be part of the report, as it consists of important information to decide whether or not to implement a new programme or policy.

As these dossiers contain, generally, this detailed information, one could also use them to give technical and legal arguments to those regulations that are being notified to the World Trade Organisation (WTO), particularly those related to non-tariff measures, such as sanitary and technical measures that are, respectively, negotiated in the TBT (Technical Barriers to Trade) and SPS (Sanitary and Phytosanitary) Agreements.

If a regulation to be issued by government is expected to generate significant trade impacts, RIA's report is supposed to contain some results from the assessment of this potential effect. Therefore, the dossier may supply the notification process with information necessary to justify the measure that is being notified, as well as to describe its impacts to different stakeholders. This procedure provides more transparency also for notifications to WTO agreements and so those gains relating to transparence improvements are extended from the domestic to the international scope.

However, this tool of regulatory quality is well spread in developed countries but it has just emerged in developing countries, where some additional difficulties are faced by policymakers and agencies. Therefore, it is important to enlighten the discussion about RIA implementation in developing countries. Several factors can postpone or jeopardise the use and success of RIA in countries that do not count on large budgets and institutional infra-structure to deal with this new tool of regulatory management. Some of these factors are pointed out below, being illustrated by the experience of recent studies conducted in Brazil.

14.2 APPLICATION OF RIA AND THE OECD MODEL

Several papers published by the OECD explain the concept of RIA, the main steps to develop it and some examples of its application (OECD, 2004, 2008, n.d.). Methodological aspects are also explored by some studies and it is very clear that even in the European Union, countries have implemented RIAs using different approaches and selecting different criteria to ranking their priorities. There are countries applying simple questionnaires and using them as the analytical background for conducting their regulatory impact analysis, and likewise there are countries applying comprehensive analysis such as cost-benefit techniques and valuation of intangible effects, most of them related to social and environmental costs and benefits, which demand a lot of skilled people and a proper infrastructure to be developed. So, there are a number of different approaches and results to present and the United Kingdom example is probably the most advanced in terms of scope and use of different methodologies, besides being very pragmatic in terms of application.

It is interesting to mention that more than quantitative results, those countries more advanced in implementing the RIA and making it useful to policymakers have been very critical about the importance of qualitative discussion whenever the impacts can be identified, but not properly estimated. Moreover, a recent

development of the RIA basic model shows that aspects related to improving transparence and the inclusion of sustainability are becoming more and more relevant to evaluate the public policy role. OECD (n.d.) presents a model called RIA-S, which has basically the same steps of RIA, but emphasises how the sustainability aspects could be enhanced in this tool application.

When governments or agencies decide to establish RIA procedures *ex-ante*, which means that it is conducted before a certain technical regulation, standard, conformity assessment or a programme is issued, the policy's transparency and legitimacy are improved when it is finally adopted. Consequently, decisions made according to these studies of RIA contribute to establish priorities in terms of public expenditures, in such a way as to reduce the number and intensity of disputes and social controversies. Moreover, usually the RIA procedures include consulting processes to those sectors and actors affected by the regulation, in order to collect data or even to ask them to help identify potential impacts or regulations and identify potential conflicts caused by an eventual regulation.

When the RIA tool is applied to evaluate a regulation that has already been implemented (*ex-post* approach), it makes it possible to analyse its effects *ex-post* like a surveillance tool, for example, it is possible to verify if the expected and estimated impacts have occurred or if they were under- or overestimated. Additionally, government has an opportunity to change or redirect or correct the path of that regulation and its implementation. It is a way to improve regulatory quality and public policy efficiency.

According to OECD (2004), the checklist to guide a study of RIA should comprise the following basic questions:

1. Is the problem correctly defined?

2. Is government action justified?

3. Is regulation the best form of government action?

4. Is there a legal basis for regulation?

5. What is the appropriate level (or levels) of government for this action?

6. Do the benefits of regulation justify the costs?

7. Is the distribution of effects across society transparent?

8. Is the regulation clear, consistent, comprehensible and accessible to users?

9. Have all interested parties had the opportunity to present their views?

10. How will compliance be achieved?

In order to evaluate the effects of a certain policy and of different scenarios or alternatives to it, quantitative tools are proposed to evaluate tangible and intangible costs and benefits, previously identified for each alternative scenario. It is still complicated to quantify environmental and social impacts due to regulations imposed by agencies; however, according to experts, some policymakers would rather have good qualitative information than doubtful quantitative results.

14.3 Regulatory quality and WTO agreements

The Technical Committee of the Technical Barriers to Trade Agreement has been stimulating discussion about regulatory impact analysis, although the first advances were made by OECD countries, as a general effort to build up a framework for RIA and spread it to a number of countries, even though they do not achieve the same level of implementation and a large heterogeneity of scope and methods.

Another illustration of the approach of evaluating impacts related to international agreements is the case of Pest Risk Analysis (PRA), which has a legal provision in the SPS Agreement and is regulated internationally by the International Standards for Phytosanitary Measures (ISPM) no. 11. This measure establishes the procedures for PRA, and clearly recommends that countries apply economic, social and environmental impact assessment besides the biological and agronomical aspects of PRA. In fact, CBA was used in two emblematic cases involving the North American trade of fruits with its partners. One case relates to the dispute between Mexico and the United States on avocados (Peterson and Orden, 2006) and the second one refers to the apple trade flows with Japan (Krissoff and Calvin, 1998). In both studies, the CBA was an auxiliary method to estimate the impacts of government decisions on imposing restrictions to trade.

So, in terms of relating the evaluation of public policy and the international agreements, considering trade aspects, there is room to work on the RIA and on the particular tool of CBA in order to provide more information and transparency to commerce and to countries' regulatory policy.

14.4 Brazilian experience in RIA

Two initiatives held in Brazil illustrate the adoption of RIA in a developing country and provide empirical elements to work on improving the use of tools to examine the impacts of policies in developing countries compared to its use in developed countries. One is the implementation of RIA by INMETRO, which basically relies on the use of CBA techniques to quantify economic impacts of new programmes of conformity assessment; and the second is the use of CBA to evaluate federal programmes for prevention, control and eradication of pests and that was proposed as the analytical framework in the scope of a big research and technological project sponsored by CNPq and led by the Federal University of Viçosa, in which the Center for Advanced Studies on Applied Economics (CEPEA) was invited to develop this specific topic.

The first initiative relates to INMETRO's efforts in quantifying impacts of its own regulatory role in terms of technical measures and conformity assessment programmes. INMETRO belongs to the Ministry of Development, Industry and Foreign Trade and is the enquiry point of the TBT Agreement in Brazil. This interface with the international negotiations on technical issues has certainly contributed to make INMETRO a pioneer in terms of creating and implementing regulatory impact assessments inside its activities, in Brazil.

Its Directory of Quality faces a large number of demands to establish rules, technical regulation and new conformity assessment programmes, both emerging from government and from private sectors. At the same time, INMETRO has been following the most recent international developments in this area, and consequently there was a natural motivation to implement RIA as a procedure to evaluate the conformity assessment programmes.

This is important to harmonise procedures in Brazil with other trade partners, even though some of these procedures are not yet compulsory in terms of international relations.

Although the Directory of Quality had already developed and adopted a procedure to have reports checking the technical viability of new conformity assessment programmes, INMETRO's staff has noticed that a world trend towards having impact analysis would sooner or later challenge its regulatory activities. So, in a pro-active action, INMETRO has invested initially in consulting international experts and evolved to develop its own RIA model, similar to what other OECD countries had already done. This process started consolidating in 2008.

In order to adjust the RIA model proposed by the OECD to Brazilian agencies and specifically to be applied in evaluating programmes of conformity assessment, in 2009 INMETRO established a partnership with CEPEA, which is a research group that belongs to the University of São Paulo (USP). The main goal was to have a guide to apply the RIA to conformity assessment programmes, but that additionally, comprised also procedures to support the process of ranking regulatory priorities and considered the particular features of Brazilian institutional structure and capacity building. As INMETRO already had a very good system to evaluate technical viability of technical regulations and conformity assessment programmes, and was also investing in hiring economists to compose its team, the proposal to work in a partnership with CEPEA aimed at improving in particular the knowledge and practical application of economic tools to quantify and analyse impacts, as well as to better examine also social and environmental effects of regulations.

The RIA system proposed by CEPEA was called RIA-S – Regulatory Impact Assessment with Sustainability – which was based upon the core model of RIA from the OECD but added some new elements from the sustainability assessments proposed also by the OECD in more recent studies. The model proposed by CEPEA comprised six basic steps: triage (to help ranking priorities using statistic tools), scope delimitation (definition of problem, alternative scenarios, potential impacts, agents affected – step of collecting secondary data and determining the

need of surveys to collect other data), collecting primary data (implementing the collection of primary data), measurement of impacts (application of methods chosen to quantify impacts or to describe them qualitatively), identification of synergies and trade-offs (analysis of results, considering the political aspects and infra-structure available to implement the scenarios), communication of results (elaboration of final dossier).

The main contributions were to make INMETRO's staff advance in terms of evaluation of economic impacts of its regulatory action and to introduce analysis of social and environmental aspects as well. Despite the fact that most of the social and environmental impacts cannot be quantified yet, the proposed methodology considers the use of qualitative analysis to handle them, taking those effects also into consideration to have a final diagnostic.

The RIA method adjusted to INMETRO needs was proposed at the end of 2009 through a Guide of RIA-S (Miranda *et al*, 2009), and later, in May 2010, this Guide was used as a reference to update an internal instruction issued by INMETRO (NIT-DIPAC – 014), defining not only risk analysis requirements but also economic impact analysis as part of the viability and impact study required to justify the proposition of new conformity assessment programmes.

INMETRO has been applying RIAs in an *ex-ante* approach for conformity assessment programmes and this experience shows that it is necessary to have a very good delimitation of the target of new regulation, as well as an efficient identification of the potential impacts, in the sense that those that should be considered are supposed to be the most effective and relevant impacts. So, the implementation of RIA has started, step by step, and is still in progress. This gradual implementation has been important to identify bottlenecks and propose solutions to deal with them. For example, re-evaluating the number of people and their qualification to be part of the technical staff in order to apply RIA and amplify the scope of impacts considered.

The process of developing the Guide of RIA-S to INMETRO provided an opportunity to have a better understanding about the difficulties of implementing this kind of tool to examine public policy quality in developing countries.

Some points that became a constant concern during the development of the methodology can be mentioned. First of all, it is important to consider the staff available to conduct RIAs and the specific skills required to do it, particularly to allow dealing with quantifying economic, social and environmental impacts. Although the technical staff of public agencies are, in general, highly qualified in Brazil, the number of staff and the specific knowledge required to work with RIAs studies might become a caveat. One example of this difficulty is the possibility to apply different econometric and statistics methods to valuation of impacts and that require very specific knowledge, like the Willingness to Pay, used to estimate demand of goods or services when there is not a formal market organised.

Moreover, staff size and time to conduct the studies have a negative correlation, in general. If deadlines are short to provide studies of RIA by agencies, it is supposed to have enough people involved in the work to deal with that or,

otherwise, it is important to delimitate the scope of the analysis to match it with the available resources to conduct the studies. If one agency intends to apply sophisticated methods to quantification and collect data to supply such studies it will be certainly necessary to have higher investments in collecting data and in having skilled people to work with them using more complex economic and statistical methods.

A second important point to make about the requirements to succeed in establishing regulatory impact assessments is taking into consideration the administrative structure of the agency, in terms of hierarchy, tasks sharing and competences. Very often, in developing countries, there are many departments or divisions committed with different tasks, but they can be related in terms of building the RIA studies. It is important to have all these people and their leaders following a mutual goal and guarantee that excessive paperwork and political aspects do not jeopardise their communication.

A third and very restrictive factor to implement RIA in developing countries refers to the scarcity of databases to provide enough information to estimate impacts. There is a direct correlation between the quality of analysis and the availability of data and good quality information. For example, if it is identified that a certain regulation will have benefits in reducing the occurrence of health problems, like cases of contamination by agricultural chemicals, which is a social and economic effect, it is necessary to have initial information about the number of occurrences of this problem in order to have an accurate estimate of the expected benefit. However, only a few countries can currently count on such kinds of statistics. One strategy is to adopt parameters and other data available in foreign countries, usually developed ones, although very often this information does not reflect the reality of developing or less developed countries.

And finally, another important factor to be considered and related to all the above-mentioned points, is financial support. It is well known that improvements in staff, databases and infrastructure are dependent on the availability of financial resources. In developing countries there are usually restrictions on budget, as governments face major problems to focus on, such as growth and employment promotion, reduction of poorness and improvement of income distribution. Regulatory quality and other public management issues are not usually ranked as priorities. So, competition for financial resources might compromise the development and implementation of new tools regarding RIA, even though these tools could provide gains in optimising the allocation of governmental funds.

In terms of political aspects, there are two points to emphasise. First of all, it is essential that agents involved in RIA are convinced about the importance and benefits of this tool and motivated to implement it. This is so, because the process of implementing RIA or any kind of impact assessment will require the determination of the whole chain of empowered people involved in it. As it will also be necessary to have more and better communication between different governmental agencies, a political desire to have these evaluations should prevail from the highest positions to the lowest in the ranking of officials in order to

provide the support, technical and political, necessary to accomplish the RIA goals.

A second political aspect to be considered is that the model of OECD for RIA, and also the one proposed to INMETRO, counts on a wide participation of stakeholders through the whole process of developing the RIA studies. RIA allows for a consultancy process at every juncture, from the definition of regulations that should be first submitted to a RIA up to the validation of the process at the end of the studies, when the results are brought to the awareness of society to be discussed and validated, before the regulation is issued by the government. The greatest advantage of conducting a transparent process of RIA is that when the regulation is finally enforced the main sectors of society affected are supposed to have already participated and be conscious about it. They have had opportunity to propose, provide information, criticise and get prepared to face the new regulation, anticipating its effects.

The second initiative that is highlighted here relates to a study developed to apply the CBA to evaluate impacts of public policy in Plant and Animal Health, focusing on programmes of prevention, control and eradication of pests. This study was conducted by CEPEA (Miranda *et al*, 2010), sponsored by a CNPq project entitled 'Inovação Tecnológica para Defesa Agropecuária' (Technological Innovation for Agriculture and Livestock Safety). This CNPq project aims to have a diagnostic of the agricultural safety service in Brazil and opportunities to improve it and one of the goals proposed was to develop and discuss a methodological approach that could be replicated to analyse the effectiveness and the net benefits of sanitary and phytosanitary policy in Brazil.

In this sense, having the information on the benefit-cost relations provided by public policies might become a strategic tool to determine priorities for budget allocation. Moreover, society has a poor understanding about the importance of controlling diseases and pests' entrance and dissemination in the territory, which makes it even more difficult to mobilise the general population, consumers and producers, to cooperate with the sanitary policy. This is so probably because although costs are usually identified and quantified by those agents that incur them, the benefits (economic, social and environmental) of safety policy are less transparent, diffuse and hardly quantified. Therefore, it is more difficult to justify public expenses in this area.

So this study is included in the scope of CNPq's project to provide more information, technical and science based, about these costs and benefits regarding sanitary and phytosanitary policies and to establish a method that could be replicated easily by agents and experts to examine different cases, and eventually be part of the Pest Risk Analysis, which is conducted by the Ministry of Agriculture in Brazil. The CBA method was chosen as a basic framework and three study cases were proposed in order to illustrate its use. These study cases were presented in the II Conference of Plant and Animal Safety, in May 2010, with an audience of officials, sanitary agents, private companies, veterinarians, agronomists, experts in different fields related to agriculture, cattle and safety

issues and several points were made to improve the methodology, the scope of impacts analysed and the specific themes of study cases.

It is interesting to note that the application of this methodological framework is an ongoing work, as some challenges are still to be overcome, most of them related to the evaluation of social and environmental aspects of pests' entrance and of sanitary programmes. Likewise, there are also some methodological and database challenges regarding the quantification of effects over public finance, either in identifying the effective expenditures to support these programmes or the impacts that diseases might cause to tax revenues.

Three study cases were chosen: the case of a fruit-fly (*Bactrocera carambolae*), which is present in Brazil but restricted to one northern state, and that is being controlled by a federal government programme to avoid dissemination to other states; Avian Influenza, which has never occurred in Brazil and is being targeted by the Ministry of Agriculture (MAPA) programme to prevent entrance; and the Greening, which is a disease that spread very fast through São Paulo State – the major citrus producer in Brazil, and the government, federal and state, used to have an eradication programme, implemented through a partnership with a private organisation (Fundecitrus) and cancelled in December 2009, particularly affecting the inspections and eradication procedures, raising even more concerns about the risk of dissemination of the disease.

Basically, the approach applied to evaluate the impacts of the programmes mentioned above was the CBA method, which was adjusted to deal with sanitary and phytosanitary issues. Some of the main points to make, which differ from the usual approach of CBA applied to investment projects and other types of objects, are: (i) it is recommendable to have a biological model that shows how the pest is expected to behave in the country, its dissemination pattern, its severity in the territory, what are the conditions that favour or restrict its expansion, and the damages that it causes in such conditions, among others; (ii) the definition of a time path that will be proper to conduct the CBA analysis; (iii) the discount rate that should be used in the CBA in order to have results that reflect the fact that sanitary policy also has social goals and not only that private costs and benefits should be accounted for.

Basically, the first step in applying the CBA to analyse the MAPA programmes was to collect the information about the pests and their behaviours; secondly, different and possible scenarios were drawn, and basically two were taken – one being 'what if' the disease or pest spreads in the territory and there is no public programme to control it; alternatively, 'what if' there is a programme preventing the entrance or spread of the pest? In the analysis, the agents and impacts of the pest entrance and dissemination were identified in each scenario proposed. The next step was to build the matrices to calculate the pattern of dissemination and to estimate impacts along the time-path of projection, impacts on production, commercialisation, exports or imports, jobs, small companies' competitiveness, government expenditures and revenues and so on.

The impacts were identified and valued directly whenever this was possible, by having market prices and other information available. For example, the

effects of having the fruit-fly expanding to regions that export fruits to Europe and to the United States would certainly result in reducing the export income. So, considering the size of imports in countries that do not allow importing from territories infected by the pest, the volume of exports lost was multiplied by an average price. So, the loss effect was evaluated. The same rationale was applied to estimate losses in production, because of lower productivity or reduction of plants and for jobs.

However, other impacts had to be only qualified as the environmental impact that the growing number of pesticides application in citrus production is causing to other agriculture activities, like production of honey, by killing bees that pollinate the orchards. Or, the social losses that will arise from having a reduction of poultry exports in regions that depend basically on this activity and that will become impoverished by an eventual Avian Influenza outbreak.

The losses estimated for each case, in the scenario that considered the presence of public policy to control or eradicate the pests were taken as the avoided losses and so, indirectly, they represent the gains or benefits of maintaining MAPA's programmes. These gains were compared to costs of those programmes, which were assumed to be only the direct expenditures of federal government to conduct them. Unfortunately, due to database restrictions, it was not possible to include also the expenses made by government with the general services of inspections and laboratories that are used by the programmes analysed but are also benefitting other governmental programmes. The comparison between avoided losses and costs of programmes resulted in net benefits, which were all monetised, and allowed calculating benefit-cost relations for each case.

Despite the difficulty of estimating all the potential impacts and the simplifications in scenarios and assumptions, all the benefit-cost relations calculated were found positive, showing that expenditures of government in those programmes are benefiting society and that it is worth keeping these programmes. Miranda *et al* (2010) calculated these relations of benefit-cost, which ranged from a ratio of 26.4 to 92.4 for the *Bactrocera* case (considering mangoes, citrus fruits and guavas); from 477.4 to 636.3 for the Avian Influenza programme; and 72 to 85.8 in the case of Greening. Of course, these numbers vary according to the time-path analysed, the assumptions on dissemination patterns and on impacts, discount rates and many other variables.

A difference between this application and the one of INMETRO, is that in the former the CBA was conducted as an *ex-post* evaluation, while INMETRO's RIA was first designed to be implemented as an *ex-ante* tool.[4] Nevertheless, it is interesting to comment that also for the sanitary policy there are several reasons and opportunities to use the CBA as an *ex-ante* approach. It is known that many pests are present in countries that share borders with Brazil and the future MAPA programmes of sanitary defence could use previous information

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4   It is important to emphasise and make clear that INMETRO has already implemented impact evaluation of conformity assessment programmes, while the sanitary case is only illustrating a research initiative to propose a model that could be eventually implemented by governmental agencies.

about potential impacts in order to guide its decisions in terms of investments in new programmes.

Brazilian private sectors could also benefit from having these kinds of results available, to help in making decisions on technology and research investments (in the chemicals sector, for example), or on capacity building of human capital (agricultural economists, for example). Strategic plans in private sectors, as well as public planning for governments, could take into consideration the expected challenges identified by studies applying the ex-ante approach.

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15

How Can Risk Management Help Enforce Technical Measures?

CHRISTOPHER GRIGORIOU

15.1 INTRODUCTION

Two major trends have shaped international trade in recent years: deeper market integration on the one hand, and lower tariffs on the other. At the same time, the use of non-tariff and behind-the-border measures (NTM and BTB) has become commonplace, reflecting the need for regulations that seek to protect consumer health and safety. In 2006, UNCTAD created 'The Group of Eminent Persons on Non-Tariff Barriers' in order to discuss, define, classify, collect and quantify non-tariff barriers (Multi-Agency Support Team, 2009). An NTM classification has since been established, adding a new category specifically for technical measures which aim to address the sanitary, phytosanitary, and technical barriers to trade. Sanitary and phytosanitary measures (SPS) have been devised primarily with the agricultural and food markets in mind, and as such, received a great deal of attention during the Uruguay Round of agricultural trade talks.[1] Measures on technical barriers to trade (TBT) cover other standards, technical regulations, as well as compliance assessment procedures for all products.[2]

While these measures are welcome in terms of consumer health and safety, they are often seen as substitutes for classic protectionist measures (tariffs), and even as a potential impediment to trade because they could complicate border clearance procedures. Efficient checks of shipments' SPS and TBT compliance is a costly undertaking. It requires not only the involvement of numerous skilled personnel, but also coordinated action from the various government agencies, not to mention the sharing of information and practices between public and private operators. Developing countries have rarely adopted such an approach, leading to the use of inappropriate processes and the misallocation of compliance management resources. As a result, clearance times increase and/or public health and safety is comprised. Agencies in charge of monitoring compliance are

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1 The General Agreement on Tariffs and Trade (GATT) leaves their regulation to sovereign governments as long as they are neither discriminatory nor connected to internal taxes or regulations.

2 Thirty-seven per cent of the TBT regulations reported to the WTO in 1997 had human health as their objective (see SPS agreement training module chapter 9, available at: *http://www.wto.org/english/tratop_e/sps_e/sps_agreement_cbt_e/c9s3p1_e.htm*).

increasingly faced with a trade-off between trade facilitation and public health and safety concerns, rather than the revenue maximisation trade-off typically faced by customs agencies. The inspection of most (if not all) SPS- and TBT-related transactions prolong clearance times,[3] yet the failure to identify fraudulent transactions can have dramatic consequences for public health and safety.

The purpose of this paper is to demonstrate how risk management can help SPS and TBT administrations handle this trade-off more effectively by focusing attention and resources on the riskiest transactions. Thanks to optimised and targeted checks, inspection opportunity costs will fall and the efficiency of inspection personnel will rise. Here, risk management can rely on one of three principles. The first is the random rule, whereby a given percentage of transactions are inspected on a random basis. The second is the selectivity rule, whereby transactions are chosen for inspection according to predetermined criteria or modalities. The third is a risk-based analysis, whereby transactions are selected for inspection according to their risk profile. The latter is established from an assessment of the probability that a false declaration has been made, derived from historical data pertaining to the transaction. Of the three approaches, only the risk-based analysis fulfils what will be called hereafter 'the golden rules of risk management'. According to these rules, the procedure must be: (i) objective (non-arbitrary) and standardised; (ii) dynamic and evolutive; (iii) not decodable by economic agents; and (iv) implemented through a computerised process in accordance with the revised Kyoto Convention.

This paper develops and details a risk-based econometric analysis that should ensure the systematic targeting and risk-profiling of transactions. An econometric method will serve to identify those elements of the declaration that are key to assessing the risk of non-compliance. We then demonstrate empirically that fewer inspections lead to better detection rates. Using hypothetical data we show that limiting the inspection rate to under 30% will lead to the identification of 90% of fraudulent declarations, while an inspection rate of 50% for lower-risk transactions will lead to the detection of only less than 2% of infringements.

Section 15.2 discusses how risk management can enhance and modernise SPS and TBT administrations and help them manage the trade-off between trade facilitation and TBT-compliance inspections more effectively. Section 15.3 gives reasons why risk management solution must be performed through risk-based assessments, according to the golden rules of risk management. Section 15.4 shows that econometrics is the appropriate basis for a dynamic and objective risk-based approach to compliance inspections. Section 15.5 explains how the risk-based approach optimises processes by demonstrating that fewer inspections mean a better detection rate. The conclusions are detailed in Section 15.6.

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3   Djankov *et al* (2006) show that a one-day delay in shipment leads to a trade reduction of at least 1%. The rate can rise to 7% if the exports are agricultural products.

15.2 Risk-based analysis as a modernisation tool for SPS and TBT administrations

15.2.1 The need for modernisation

An increasingly complex environment means that SPS and TBT agencies are often powerless to enforce and check the compliance of declarations and shipments with adequate efficiency. Added to this is the fact that they tend to lack modern IT technologies, not to mention poor coordination with high-tech customs' agencies. Widdowson and Holloway (2011) point out common weaknesses in the compliance inspection procedures of SPS agencies. Besides inadequate information technology resources, systematic data gathering and feedback from inspections are rare. This hampers the establishment of risk profiles, which in turn leads to higher-than-necessary inspection rates. These shortcomings also favour recurrent bias in interventions aimed at generating revenue from fees and informal payments arising from corruption and rent-seeking.

Given that SPS agencies are much smaller than customs' agencies and do not have the same level of modern technology at their disposal, particularly an IT infrastructure, there is an expectation that customs' agencies could help build the capacities of SPS agencies. For example, much of the data required for the risk-based analysis of technical measures are already integrated in the customs' management system. Moreover, cooperation would be in the interests of both the private and public sector, as it would reduce clearance times and increase the effectiveness of inspections. To date, however, cooperation between SPS services and customs has tended to be the exception rather than the rule. Van der Meer and Ignacio (2011) report that capacity-building projects between customs and SPS agencies are virtually non-existent and that their relationship, in certain cases, can border on the adversarial. Administrative processes, such as declarations, the payment of duties, data gathering, quarantine agencies and border police, tend to be duplicated and performed in isolation. In addition, Widdowson and Holloway (2011) point out that the risk management process is generally not an integral part of the management framework of the given organisation and, as such, is not systematically implemented and incorporated within border management.

15.2.2 The need for a risk-based approach

When checking compliance with technical measures, quarantine officers focus first on the examination and tracking of the necessary paperwork from which they extract all the relevant statistics and information. Afterwards, they may carry out an inspection or tests on either the entire transaction or a sample thereof. Finally, if an infringement is found, the transaction is forwarded for destruction, quarantine or treatment. In all other cases, it is sent on for release or clearance. Many countries do not use the results of a risk-based analysis to decide on which channel the transaction should be directed towards. This means that they carry out more inspections and laboratory tests than required. Furthermore, they tend,

in the interests of revenue maximisation, to bias inspections in favour of formal enterprises rather than high-risk producers. This is obviously a lose-lose system as neither trade facilitation nor public health and safety benefit. Increases in the incidence of unnecessary inspections have resulted in higher costs for the private sector. Moreover, it is not only impossible but also counter-productive for the agency to inspect and check every transaction. With limited resources, the opportunity costs of inspecting both low- and high-risk importers are considerable. Concentrating time and resources on compliant importers limits the resources available for the inspection of high-risk importers. The adoption of a risk-based approach would reverse this situation by effectively tackling the trade-off problem associated with the enforcement of technical measures. Some customs' and tax agencies have successfully adopted such practices, generating benefits for both the public and private sector.

15.2.3 More to risk management than risk assessment

World Customs Organisation (WCO) guidelines[4] recommend that the risk management process is implemented in five stages: (1) context analysis; (2) risk identification; (3) risk analysis; (4) risk assessment and prioritisation; and finally (5) treatment and evaluation as described in Figure 15.1 from the Risk Management Guide (WCO, 2003).

Figure 15.1 *Original WCO Risk Management Framework*
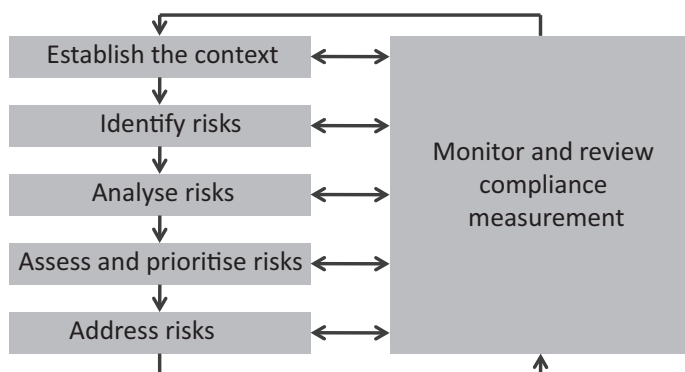
Source: World Customs Organization (2003).

Each stage provides insights that are used to inform the subsequent stage. It may take some time before the process is implemented effectively due to the gradual improvements that must be made in order to establish and update the fraud database. Risk-based processes determine what action (such as sample tests and full inspections) should be taken on each transaction according to its risk profile.

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4   WCO guidelines to its Revised Kyoto Convention (International Convention on the Simplification and Harmonization of Customs Procedures), available at: *http://www.wcoomd.org/Kyoto_New/ Content/content.html*.

This is established from an assessment of the probability of non-compliance, which is derived from historical data pertaining to the transaction, that is, whether or not elements of the declaration have been linked to previous cases of fraud. By ensuring that the correct priority is given to the correct action by singling out the riskiest transactions, risk-based processes lead to a more efficient allocation of resources. Risk management is therefore not only a selection tool and router but also greatly helps to increase efficiency by optimising resource allocation and modernising the administrative structure through the use of modern technologies and infrastructure. Moreover, risk management is per se an incentive to comply with regulations. In the context of the principal-agent model with asymmetric information, Alm *et al* (1993a, 1993b) show how risk-profiled importers have an incentive to adopt compliant strategic behaviours. Risk management naturally influences importers' behaviour and advances compliance through inspections, detection and sanctions (penalties or destruction of the merchandise). This incentive will be further reinforced because the targeting strategy will concentrate on high-risk declarations. Also, risk-management techniques generate business intelligence as well as a reporting basis for the administration to assess how efficient its compliance inspections are. Finally, given the lack of private-public cooperation, inspections provide a good opportunity for the administration to remind importers of their legal obligations and therefore may also serve as an educational tool.

15.3 RISK-BASED APPROACHES TO RISK PROFILING

We call the golden rules of risk management the requirements that a proper profiling method must fulfil. First, the basic rules used to profile the risk of a transaction must rely on an objective and standardised method. The aim here is to avoid arbitrary decisions and exclusive reliance on human intervention as well as to eliminate possible collusion or corruption opportunities. Second, given that the world trade structure is constantly shifting, the risk management system has to be dynamic and evolutive. As previously stated, the implementation of a risk management system will imply changes in strategic behaviour as well as new incentives that need to be considered. Third, the rules underlying specific risk profiles should not be decodable by the importers so as to prevent them by-passing the rules. Finally, a risk management system should be implemented through a computerised process, in accordance with both the revised Kyoto Convention and the recommendations of international institutions on modernising processes through non-intrusive and standardised methods.

  Depending on their level of modernisation, customs' agencies can choose from the selectivity rule, the random rule or risk-based selection when deciding on which transactions are to be inspected. Indeed, the risk-based approach is part of the modernisation programme for transition and developing countries, devised by international institutions (see among others Widdowson, 2005). The selectivity rule refers to a set of specific criteria on which the future route of the declaration is determined. These draw primarily on the inspectors' knowledge of

importer behaviour and background. For instance, there will be a special focus on all imports from countries A and B, or imports with specific HS codes will be uniformly considered as high risk.[5] While this technique might appear fit for purpose, given that it requires only a limited amount of data and relies on local knowledge, it does have major shortcomings: (i) it increases the risk of collusion or corruption between the inspector and importer since the former manages the information and therefore the selectivity criteria may be chosen arbitrarily; (ii) the criteria to be used to route the declarations to the high-risk channel can be decoded by non-compliant actors; (iii) it is not dynamic because the fraud patterns will change as soon as non-compliant importers adapt their behaviour to the monitoring strategy and because the selectivity rule is, by definition, static. These drawbacks mean that this approach is of limited interest. However, it could be used as a complement to the risk-based approach due to the fact that it takes into account intelligence on a specific cargo or declaration which has been gathered from cooperation with other services, for example.

As the name suggests, the random rule means that transactions are randomly selected for inspection. This method does not require a sophisticated IT infrastructure and ensures that importers are treated equally. Given that the inspection likelihood is the same for all importers, risks of corruption and arbitrary selection are significantly reduced (providing that random inspections actually are random). In addition, it serves as an incentive for compliant importers to remain so, because they are just as likely to be subject to an inspection. This last point is in contrast to the selectivity rule, which would never choose a 'known' compliant importer for inspection. Finally, the random selection method is capable of detecting new types of infringements. However, it also has major limitations. First, it is not dynamic, by definition. Its randomness means that there is no opportunity to use information gleaned from previous infringements and compliance patterns. Moreover, it generates substantial opportunity costs because the high-risk declarations will have the same likelihood of being selected for inspection as low risks. Ultimately, this leads to an inefficient allocation of resources. These shortcomings, therefore, limit the interest of the random rule. However, it could be used to complement a risk-based approach due to the fact that it checks the consistency of the low-profile declarations, a common concern for all risk management systems.

In recent years, modern administrations have increasingly implemented risk-based selection methods to profile, target and inspect non-compliant declarations. The thinking behind this practice is to attribute scores to each declaration with a view to ensuring that the lion's share of inspection resources are concentrated on declarations that present with the highest risk of non-compliance (see Geourjon and Laporte, 2005). The scores depend on the declarations' attributes and the infringement patterns observed over past transactions. This type of risk profiling is dynamic because it is continuously updated to take account of new

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5   This method is implemented via Asycuda, the custom management system developed by the United Nations.

information and changing patterns. Moreover, if the scoring method is based on a scientifically objective approach, it is by definition non-arbitrary and cannot be decoded by importers. Finally, risk-based selection can, and should, be combined with the selectivity approach to allow the system to gather intelligence on specific cargos or declarations. The same applies to the random rule, as this solution tracks low-risk profiles and thus sends a clear message to compliant importers. The next section describes how econometrics can be used to run this type of risk profiling.

15.4 ADAPTABLE AND OBJECTIVE RISK-BASED METHODS FROM ECONOMETRICS

Econometrics has many advantages for risk-based approaches, particularly as regards technical measures and public health and safety issues, where the risk profiles of declarations need to be ranked accordingly. Regression analysis first filters the elements of the declaration (eg country of origin and the HS code), or criteria as they will be called here, that are of relevance for the risk-profiling process. It then weighs the scored criteria to arrive at the total score, which will determine what risk profile will be attributed to the transaction: the higher the score, the riskier the profile. Moreover, econometrics allows for several approaches depending on data quality and the type of fraud. These approaches come with a very large subset of methods, from linear to non-linear estimates depending on the type of non-compliant behaviour that is being targeted or profiled, including time or individual specific effects through panel modelling. The observed (measure of) non-compliance is the dependent variable which represents the behaviour we aim to model. This variable can be either categorical or continuous. The explanatory variables are the scored criteria. Regression econometrics defines which of these are likely to affect the dependent variable. For example, SPS infringements may be influenced by the importer, the country of origin, the HS code or the broker, but not by the packaging or the mode of transport.

Apart from technology issues, the input for any risk management application is the fraud database. Of course, because the purpose is to model non-compliant behaviour, this must be observed. The database therefore should gather data on the transactions, such as the importer code, HS code, country of origin given in the declaration, as well as on inspection details like the release or destruction of merchandise, or a penalty. This database is built up incrementally and continuously updated to reflect possible changes in the behaviour to be modelled. If no such database exists, the first step is to prepare and integrate one in the administration system. Scores are then computed for each element of the declaration accordingly with the priorities of the SPS and TBT administration. These scores reflect the risk profiles resulting from the compliance history of these elements. For instance, the score for each country of origin will be higher if it has been frequently linked to non-compliant declarations. As the fraud database is continuously updated through the inclusion of new declarations, so too are the scores given to each element, thus ensuring a dynamic and permanent

adjustment of the process to any changes in fraud patterns. The next step is to identify the scored criteria which can be used as effective predictors of fraud, that is, the scored criteria that are significantly correlated to the fraud measure. The regression analysis has two aims. It first defines which scored criteria are effective predictors of fraud, that is, which criteria have a coefficient that is significantly different from zero. These can then be used as risk profilers when a new transaction comes up for assessment. Second, the regression analysis provides the coefficient estimates that will be used to weight the scored criteria in order to compute the total score. Once the regression has been run, each new declaration will be risk-profiled from the scores of its modalities weighted through the estimated coefficients to provide the total score for the declaration, which determines the risk profile it will be given. It should be noted that the use, albeit partial, of the selectivity and random rules will continue, the first in order to draw on specific intelligence arising from inter-agency cooperation, the second to provide compliant importers with incentives to remain so.

Once the predictions have been made, econometrics can still bring considerable added value to the system because it makes it possible to 'go beyond the black box', providing evidence on the relationships (causality) between the observed infringement and each criterion as well as on the contribution of each criterion to the overall risk profile. Moreover, it also gathers scored criteria as well as statistical results and predictions, allowing for the detailed analysis required for reporting purposes or for evaluating system performance. Finally, the performance and consistency of the system can be assessed by means of contingency tables. This reporting step is vital because it is a powerful demonstration of the need and added value of a risk (-based) management approach by validating the accuracy of the model.

Table 15.1 matches the predicted and actual status of the declarations (compliant versus non-compliant) and presents type 1 and 2 errors as well as the percentage of correct predictions, which itself is a measure of the model accuracy rate. Prediction efficiency measures the percentage of non-compliant declarations that the model predicted correctly. The strike rate measures the percentage of non-compliant declarations that will be detected when non-compliant predictions are controlled. Consequently, a trade-off results between efficiency and strike rates: prediction efficiency must be reduced to improve the strike rate and vice versa (see Gupta and Nagadevara, 2007). Indeed, improving the strike rate implies lowering the number of inspections in order to reduce the number of false positives (erroneous non-compliant predictions, ie inspection of compliant transactions), which may in turn lead to a rise in the number of false positives (erroneous compliant predictions, ie no inspection of non-compliant transactions), thus lowering the prediction efficiency rate.

Table 15.1 *Contingency table for the predicted and actual status of the declarations*

		Predicted	
		Compliance	Infringement
Real	Compliance	True negative	False positive
	Infringement	False negative	True positive

15.5 APPLICATION

This section aims to illustrate the added value of the risk-based method relying on econometrics to target non-compliant declarations and to optimise inspections through a set of fake data generated for the purpose of this exercise.

15.5.1 Data

This application is run over the following hypothetical data which are based on 100,000 observations. The assumptions underlying this database are that 24.8% of declarations are non-compliant and are consequently considered fraudulent. The following elements of the declarations are considered as potential criteria to target the declarations to be inspected. (i) The internationally standardised system of names and numbers for classifying traded products, (HS codes): 7,406 kinds of goods (ii) the trade partners: 130 countries of origin; (iii) the importers: 8,364 TIN numbers; (iv) the brokers: 1,606 brokers; (v) the final destination: are the goods intended for consumption, for trans-shipment or for a warehouse? (vi) the entry site: 14 different sites are considered as potential entrance points in the importing country; (vii) the packaging: are the goods from the declaration packed in cartons, traditional packaging or something else? The description and number of associated modalities for each criterion are reported in Table 15.2.
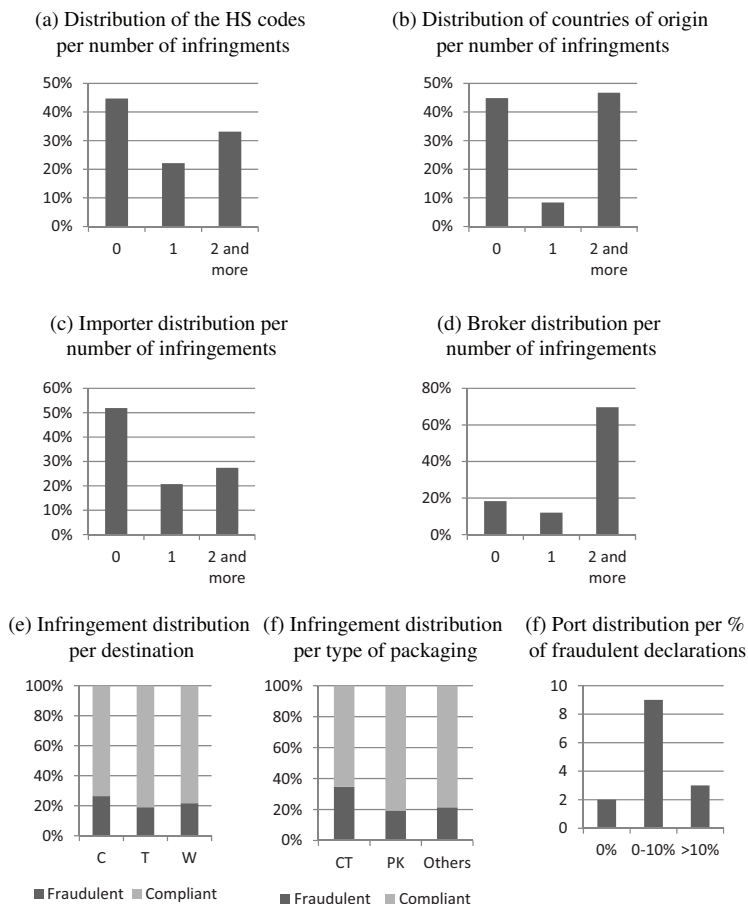
Table 15.2 *Criteria used to predict fraud – 100,000 observations*

Criteria	No. of modality	Criteria description
HS code	7,406	Item HS classification
Country of origin	130	Country of origin
Importer	8,364	Importer name
Final destination	4	Consumption/trans-shipment/warehouse
Entry port	14	Entry port identifier
Broker	1,606	Broker name
Packaging	3	Cartons (CT)/packages (PK)/others

Figure 15.2 describes the main features of these elements from the declarations; no more than 40% of the HS codes and country of origin were compliant (Figure 15.2a and b). Almost 50% of importers were linked to at least one infringement (Figure 15.2c), while more than 80% of brokers were linked to at least one fraudulent declaration (Figure 15.2d). Regarding the destination of

the goods, approximately a quarter of goods intended for consumption (Figure 15.2e, column C) were linked to at least one infringement, which is somewhat higher than the share observed for goods in transit (T) or for warehouse (W). Regarding packaging, goods packed in cartons (CT) were more often associated with fraudulent transactions than other packaging schemes. Finally, of the 14 sites defined as entry points, two had never been linked to any kind of fraudulent declaration, nine have had less than 10% of fraudulent declarations and, in three sites 10% of imports were non-compliant.

Figure 15.2 *Declaration elements and infringements*

(a) Distribution of the HS codes per number of infringments

(b) Distribution of countries of origin per number of infringments

(c) Importer distribution per number of infringements

(d) Broker distribution per number of infringements

(e) Infringement distribution per destination

(f) Infringement distribution per type of packaging

(f) Port distribution per % of fraudulent declarations

15.5.2 *The limited dependent variable model*

The logit and probit estimators are specifically designed for binary dependant variable models (see Laporte, 2011). Because a regression with a binary dependent variable Y models the probability that $Y = 1$, it makes sense to adopt a non-linear formulation that forces the predicted values to be between 0 and 1.

Given that cumulative probability distribution functions produce probabilities between 0 and 1, they are used in probit and logit regressions, whereby probit regressions, which will be used here, use the standard normal cumulative distribution function. This implies the use of the maximum likelihood method to estimate the weighting of the explanatory variables in order to maximise the chances of correctly predicting the dependent variable.[6]

The binary variable identifies two different cases, the probability of which we want to assess. The added value of this method is that it covers the entire consistent set of information related to the targeted event and to associate it with an assessed probability. For our purposes, we differentiate between fraudulent and compliant declarations with a view to predicting the probability that a new declaration will be fraudulent. In other words, the probit regression model is:

$$P(Y = 1/X_1, X_2, \ldots, X_n) = \varphi(\beta_0 + \beta_1.X_1 + \beta_2.X_2 + \ldots + \beta_n.X_n)$$

$P(Y = 1)$ is the probability that the declaration is fraudulent. φ is the cumulative standard normal distribution function. X_{1i}, X_{2i}, $\ldots$, X_{ni} are the scored modalities of the associated criterion, accordingly with Section 15.4. Here, we have X_{1i}, X_{2i}, X_{3i}, X_{4i}, X_{5i}, X_{6i}, X_{7i}, which are the scored HS code, country of origin, importer, final destination, entry point, packaging and broker of the declaration (item i), in that order. Finally, β_1, β_2 $\ldots$ β_n are the parameters we wish to estimate. These parameters reflect the impact of any change in X (the scored modalities) on the probability of non-compliance.

15.5.3 The regression

Table 15.3 reports the econometric regression.

Table 15.3 *Fraud measure on the scored criteria*

Dependent variable	Infringement
Importer	0.67*
Country of origin	3.23*
HS code	1.01*
Final destination	–2.21
Entry port	0.76*
Broker	0.16*
Packaging	0.53
Constant	–2.26*
Obs	90,760
Estimator	Probit
Log likelihood	16,004
Pseudo-R^2	0.59

Note: * Refers to a coefficient significant at the 10% level from robust standard errors

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6   Instead of minimising the errors as in the linear case.

This regression provides four insights for the risk-based assessment of declarations. The first two results from the regressions table (Table 15.3 – fraud measure on the scored criteria). (i) It indicates which criteria are significant fraud predictors, in other words the criteria that should be applied in order to select which goods will be inspected. For these particular criteria, the likelihood of fraud will rise, the higher the scored modalities are. It appears from Table 15.3 that only the HS code, country of origin, importer, entry port and broker are good predictors of fraud. (ii) It provides the weights to be used to compute the probability of fraud (pr[Y_i = 1]) associated with a specific declaration (β_i) through the normal cumulative distribution function φ. (iii) The third element provided by the econometric regression is the contingency table to figure out the consistency of the modelling (Table 15.4). Matching the predicted fraudulent/compliant cases, in other words the predicted 0 and 1 to the actual fraudulent/compliant declaration, we can compute the following contingency table, which provides evidence on the quality of the predictions.

Table 15.4 *Contingency table*

'Real' fraud	Predicted fraud		Total
	0	1	
0	70%	5%	75%
1	4%	21%	25%
Total	74%	26%	100%

It is possible to compute from this table several parameters that characterise the quality of the predictions. We can also conclude from the accuracy rate that the model performs well, given that the success rate as regards the predictions is 91%. Moreover, by reporting the number of true positives (21%) as a share of the total number of fraudulent declarations (25%), we obtain a measure of prediction efficiency (84%). Finally, the strike rate (81%) is defined as the number of true positives (21%) in all cases predicted to be fraudulent (26%).

Ordering the declarations by decile of level of assessed risk demonstrates that focusing on the riskiest transactions is the best way to optimise the inspection process. The data are first ordered by risk of fraud (assessed probability) and then classified by decile, with the first decile corresponding to the riskiest 10% of transactions, and so on. For each decile, the corresponding number of actual fraudulent transactions is computed. It is then cumulated to derive the percentage of fraudulent transaction that would have been detected had we used this model to direct and select them for inspection. Figure 15.3 shows that inspecting only the first decile (10% of the riskiest transactions) would result in the detection of almost 40% of infringements, while inspecting 20% of the riskiest would result in the detection of almost three-quarters of infringements, and inspecting 30% would lead to the identification of over 90% of the non-compliant declarations. On the other hand, inspecting 50% of declarations that were predicted to have the lowest level of risk would only detect less than 2% of additional cases of fraud.

Figure 15.3 *Distribution of actual infringements by deciles of predicted level of risk*
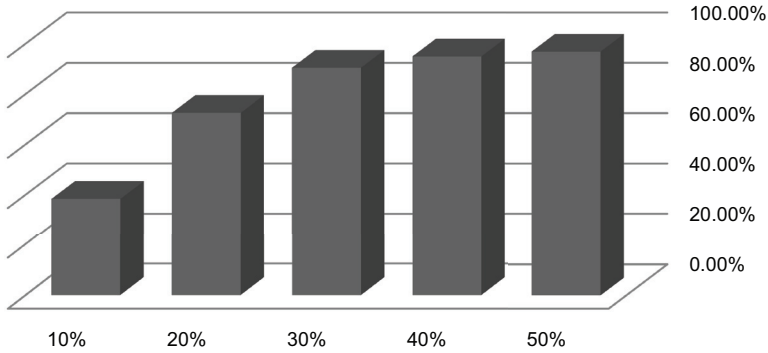
These findings are all the more promising when we compare them to the findings from other methods. Indeed, while we have seen that inspecting under 30% of declarations would lead to the detection of more than 90% of infringements, a random rule would require the inspection of 90% of declarations to achieve the same rate of success.[7] Moreover, the econometrics method is by and large more convincing than the selectivity rule due to the fact that it is continuously updated and adjusted to changing patterns and trends. As new infringements are detected, the scored modalities change, as does the output of the econometric regression (coefficients etc.).

15.6 CONCLUSION

This paper has shown how risk management can help SPS and TBT agencies to handle increasingly complex regulations more effectively by focusing attention and resources on the riskiest transactions. Risk-based analysis is the most suitable method as it fulfils the golden rules of risk management, which require the methodology to be objective (non-arbitrary) and standardised, dynamic and evolutive, not decodable by the economic agents, and implemented through a computerised process in accordance with the revised Kyoto Convention. Moreover, econometrics is essential in this risk-profiling process as it identifies the elements of the declaration that should receive the most attention and enables the assessment of new declarations. We then demonstrate empirically that fewer inspections can mean better detection rates. Using hypothetical data, we show that limiting the number of inspections to under 30% of transactions will lead to a 90% detection rate, while inspecting 50% of lower-risk transactions would only detect less than 2% of infringements.

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7   Given the probability of detecting fraudulent transactions with a random inspection (24.8%) and the 90% detection target rate (which corresponds to 22,390 declarations), one would need to inspect 90,000 of the 100,000 transactions.

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