

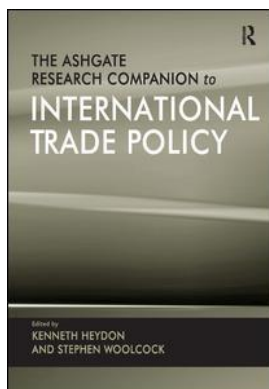
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Non-Tariff Measures

Michael J. Ferrantino¹

Introduction

Tariffs have declined substantially throughout the world from the high levels observed prior to the Great Depression. These declines, implemented unilaterally, multilaterally in the GATT/WTO system, and through preferential trade agreements (PTAs), have made non-tariff measures (NTMs) increasingly more important for the international trading system. Few would question that NTMs have increased in importance relative to tariffs as a means of restricting trade. They may well have increased in absolute importance also. This is because many NTMs are outgrowths of national regulation of economic activity, most notably technical barriers to trade (TBT) and sanitary and phytosanitary measures (SPS) in agriculture. As national economic regulation has become progressively more extensive, the interface between such regulations and international trade has similarly grown.

A variety of definitions have been offered for NTMs, or alternately for non-tariff barriers (NTBs). While 'non-tariff barrier' is often taken to be synonymous with 'non-tariff measure', there is a difference in connotation. The term 'non-tariff barrier' suggests a policy imposed by governments that is in violation of an agreement, or at least inconsistent with it. 'Non-tariff measure', by contrast, denotes the existence of a policy, other than tariffs, that may affect trade, without prejudgment as to the legal status of that policy, or its appropriateness from a welfare standpoint. Many NTMs, such as inspection of food at the border, are intended to protect public health or safety, and are specifically allowed for in the text of the WTO agreements and the various PTAs. The choice of 'NTM' rather than 'NTB' in the present chapter is intended to draw focus to the economist's question, 'What are the economic effects of this measure?' rather than the lawyer's question, 'Can this measure be challenged at dispute settlement as being in violation of an agreement?'

The Multi-Agency Support Team (MAST), an international group of experts convening in support of the United Nations Conference on Trade and Development's

¹ This chapter represents solely the views of the author and is not intended to represent the views of the US International Trade Commission or any of its Commissioners.

(UNCTAD) work on NTMs, proposed the following definition: 'Non-tariff measures 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' (MAST 2008). This definition focuses on the economic effects of NTMs, rather than their legal status. Legally, NTMs are only described as 'policy measures', that is, they are undertaken by governments. Defining NTMs in this way excludes private standards, such as the international buying practices of large retailers like Carrefour or Walmart, or private labeling schemes such as RugMark, which aims to certify that no child labour has been used in the manufacture of carpets. From an economic standpoint, private standards may have effects similar to policy-imposed NTMs, particularly for exporters in developing countries who find such standards costly to implement, and some researchers may consider private standards to be NTMs. The definition also excludes other difficulties that traders may face that are not directly caused by government policies, such as lack of information about foreign markets, problems in obtaining finance, or linguistic and cultural differences. Such impediments to trade have practical effects that are analogous to government-imposed NTMs.

Even by the definition above, the universe of NTMs may appear unmanageably broad. In a world of interconnected markets, any policies undertaken may have indirect effects on trade, even if the policies are purely domestic and not targeted specifically at imports or exports (think of income taxes). In order to limit the scope of inquiry, resort is often sought to an enumerated list of policies considered to be NTMs, usually having the feature that they are intentionally directed at trade in some way. The next section of this chapter will discuss specific types of NTMs using the list recently developed by MAST. Even so, there are a wide variety of issues in international trade policy that are not about tariffs, usually considered as separate from the topic of NTMs, but related to NTMs in some way. It may be helpful to attempt to delineate a bit further the boundaries between NTMs and some of these other trade policy issues.

From the standpoint of the economist, the topic of NTMs overlaps broadly with trade facilitation. Trade facilitation is usually conceived as measures governments can take to make trade easier, such as providing easy electronic submission of trade documents or reducing inefficiency or corruption in the customs service (see Chapter 7). NTMs are actions undertaken by governments to make trading more difficult. Seen this way, a trade facilitation measure is in effect a negative NTM, and the removal of an NTM can be considered trade-facilitating. Measures used to quantify the effects of NTMs, such as those discussed later in this chapter, generally can also be applied to the analysis of trade facilitation.

Both goods and services face barriers and impediments to their international exchange. Since services do not clear customs and do not pay tariffs, any measures restricting services trade are by definition NTMs. However, trade in services has particular features that make it analytically distinct from exchange in goods. Most services cannot be delivered effectively by cross-border means such as the post or Internet. Services trade usually requires some physical human presence – either the buyer or the seller usually moves to be face-to-face with the other. In many

cases, service firms accomplish this by establishing affiliates in foreign countries through FDI. Barriers to FDI, though non-tariff in nature, thus affect trade in services. FDI barriers also affect goods trade, since a significant proportion of goods trade takes place within the boundaries of multinational firms. For example, in 2008 approximately 46 per cent of all US exports of goods and 36 per cent of all US imports of goods were associated with multinationals (Barefoot and Mataloni 2010).

Issues regarding intellectual property rights (IPRs) often appear in inventories of non-tariff measures, especially when such inventories are constructed based on complaints and concerns of traders. It is true that weak enforcement of IPRs can influence trade flows, and that IPRs are not tariffs. However, concerns about IPRs are very different analytically from most concerns about NTMs. Most NTMs have the effect of restricting trade and raising the prices of traded goods. However, weakly enforced IPRs have the opposite effect – they tend to lower the price of goods and may actually increase trade flows, since some exported and imported goods are counterfeits (OECD 2008). Thus, the analytical tools generally used for NTMs are usually not well suited for questions involving IPRs.

Types of NTMs and Their Operation

The UNCTAD–MAST Categorization Scheme

Historically, UNCTAD has provided information on NTMs for various countries on a tariff-line basis in its Trade Analysis and Information System (TRAINS) database. Following on the work of MAST in 2006–8, UNCTAD has substantially revised its categorization scheme for NTMs, to be used both in future versions of TRAINS and in surveys of market participants. In the current classification, the main headings are as follows:

1. sanitary and phytosanitary measures;
2. technical barriers to trade;
3. other technical measures (including pre-shipment inspection and special custom formalities not related to SPS/TBT, and other measures);
4. price control measures;
5. quantity control measures;
6. para-tariff measures (including customs surcharges, additional taxes and charges, internal taxes and charges levied on imports, decreed customs valuations, and other measures);
7. finance measures;
8. anticompetitive measures;
9. export measures;
10. trade-related investment measures;

11. distribution restrictions*;
12. restriction on post-sales services*;
13. subsidies*;
14. government procurement restrictions*;
15. intellectual property*;
16. rules of origin*.

This scheme reflects recent changes in the ways governments use NTMs. The regulatory policies (SPS and TBT) are given first place. These policies, which were lumped together in the previous classification as 'technical barriers', are separated out to reflect the special features of agricultural NTMs. The emphasis given to SPS and TBT measures reflects their actual significance in the experience of traders: in UNCTAD surveys of exporters and importers in six developing countries about their experience with NTMs, the share of complaints pertaining to SPS or TBT ranged from about 65 per cent in India, Tunisia and Uganda to 93 per cent in Thailand (Basu 2009). The categories marked with an asterisk (*) are not used by UNCTAD to collect official data, but are reserved for use in surveys of traders' complaints.

The practical difficulties traders face with NTMs do not always relate to the *de jure* content of the measures, but to the way in which they are administered. Previous reports on NTMs, such as the National Trade Estimate of the United States Trade Representative (USTR),² the EU's Market Access Database³ and the members' comments on the WTO's Trade Policy Reviews⁴ have identified a variety of procedural issues with the way NTMs are implemented. These issues are reflected in UNCTAD's survey work as 'procedural obstacles', which include such problems as arbitrariness or inconsistency; discriminatory behaviour favouring specific producers or suppliers; inefficiency or obstruction; non-transparency (including 'informal payment expected or required', legal issues and unusually high fees and charges).

Related to such practical problems with NTMs as arbitrariness, obstruction and non-transparency is the tendency in many cases for countries to apply an ever-changing variety of policies to the same product. This means that if traders succeed in surmounting one NTM, either through dogged adherence to administrative procedures or by the efforts of trade negotiators to eliminate particular NTMs, new ones pop up in their place.

The operation of each of the main types of NTMs will now be described, including some of the asterisked items above since they refer to important topics in trade policy not discussed at length elsewhere in this volume.

² A historical series of these reports are available at: http://tcc.export.gov/Country_Market_Research/National_Trade_Estimates/index.asp.

³ Available at: <http://madb.europa.eu/>.

⁴ Available in English at: www.wto.org/english/tratop_e/tpr_e/tpr_e.htm.

Sanitary and Phytosanitary Measures and Technical Barriers to Trade

Both SPS and TBT represent the extension of government regulation to the realm of exports and imports. SPS can be thought of as a special category of technical barriers to trade applying to agricultural products. Both SPS and TBT measures are generally designed to protect public safety, health or the environment, and thus arise as part of the routine regulatory activities of governments. The international system has long recognized the potential tension between the regulatory objectives of governments and trade liberalization. Article XX of GATT 1947 implicitly recognizes that legitimate domestic regulatory purposes may require the adoption of measures at the border, so long as such measures do not act as a 'means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail, or a disguised restriction on international trade'.

As an example of this tension, governments can refuse entrance at the border to agricultural goods containing pests or contaminants. But governments may also stop such goods at the border for long enough that the inspection causes them to spoil, or refuse to explain to traders the steps necessary to have their goods certified as pest-free or uncontaminated. In such cases, suspicion of a disguised restriction on international trade may arise. The balance between the interests of regulation and the desire not to unduly impede trade is further elaborated in the Uruguay Round SPS and TBT Agreements of 1994. For example, the SPS Agreement states that SPS measures should be 'based on scientific principles' and 'not maintained without sufficient scientific evidence'. While TBT provisions are generally thought of as applying to manufactures, both SPS and TBT issues can arise for agricultural goods.

The legal analysis as to whether a given SPS or TBT measure is in compliance with the WTO or a PTA is distinct from the economic analysis as to whether the benefits arising from a regulation exceed its costs, including any costs arising from the restriction of trade. While dispute settlement bodies must make bright-line distinctions about whether or not regulations and standards comply with trade agreements, economists must wrestle with the practical difficulties in measuring both costs and benefits. The benefits to consumers are often harder to measure than the costs induced by distortions to trade, but measuring the costs is not always easy either. One celebrated case involves the question of whether the health benefits of a tightening of European health regulations on aflatoxin in groundnuts is worth the loss in exports to African groundnut producers. Measures of lost exports associated with the regulatory change turn out to be highly sensitive to the statistical methods employed (Otsuki et al. 2008; Xiong and Beghin 2010).

One hot-button issue frequently arising in the context of SPS is that of genetically modified organisms (GMOs). Crops grown from seeds using recombinant DNA techniques have increased yields as well as improved the physical attributes of food, and have been widely adopted in many countries. However, they have been banned in many other countries because of concerns about safety. The question of whether bans on GMOs are based on scientific principles, or instead constitute trade-restricting NTMs, has taken up a good share of the SPS matters under

dispute settlement, along with issues surrounding labelling (Walkenhorst 2003). Another frequently arising question comes from measures affecting trade in beef products, arising from concerns with bovine spongiform encephalopathy (BSE) (also known as mad cow disease), the use of hormones to accelerate the growth of cattle or related issues (USITC 2008). In the case of BSE, disputes arise from the fact that measures taken by countries to deal with BSE outbreaks, such as slaughtering large number of cows in the vicinity of an affected cow, are often not accepted as evidence of safe meat by a country's trading partners even when the affected country certifies the meat as safe for its own consumers.

Technical barriers to trade include product and process standards, technical regulations such as labelling, traceability requirements or tolerance limits for residues or restricted use of substances, as well as the conformity assessment procedures involved in certifying that imported goods correspond to national technical standards. Like food safety rules, standards are often meant to address practical issues. Standardized products allow for interoperability of goods made by different producers, as well as network economies arising from the ability to engage in transactions among a large group of individuals or firms. Standards can also be burdensome and duplicative. A power supply for a personal computer often contains markings from well over a dozen governmental and private standard-setting bodies, often imposing duplicative tests for such properties of the good as radio non-interference. The costs of obtaining the certification from each standard-making body, represented by a particular market, are borne by the manufacturer and ultimately the consumer of such goods. Such approaches as mutual recognition agreements among trading partners, unilateral recognition by one country of a trading partner's testing results, and increased acceptance of suppliers' declarations of conformity (SDoC) in which businesses self-certify their cooperation with standards, are approaches that can reduce the likelihood that certification procedures for health and safety become onerous TBTs (Johnson 2008).

Product standards can also potentially be used by governments to favour domestic firms in industries undergoing technological change. In the early stages of the development of a technology, products are often offered in non-compatible formats, such as the competing Betamax and VHS formats for video cassette recorders in the 1980s. While the marketplace is capable eventually of settling on a standard, in principle governments can use an official choice of standard for a technology in flux to exclude imports of competing goods. For example, in the market for mobile telephones and telephone service, it has sometimes been claimed that official choice of standards has impeded market access. Since a standard may be embodied in a group of patents which must be licensed in order to implement the standard, there are complex relationships between certain TBT issues and issues involving intellectual property.

Customs Measures

Delays in clearing customs are a frequently voiced complaint of traders. The Trading Across Borders data, compiled for the World Bank's *Doing Business* project, show that in developing countries such delays are comparable in magnitude to those associated with bad roads and slow water transport. In a world of rapid logistics, with increasing emphasis on supply chains with just-in-time manufacturing processes and quick response to changes in consumer demands, time is money. Methods relying on the willingness of shippers to pay a premium for faster air transport show that the 'tariff equivalent' of delays at customs is on the order of 1 per cent per day for the most time-sensitive products (Hummels 2007). Multiple border crossings add further burdens to traders exporting from or importing to landlocked countries (Arvis et al. 2010).

Improvements in customs procedures can take a variety of forms. Changing from paper to electronic processing of documents can both speed up clearance and reduce corruption. Appropriate risk assessment techniques, targeting specific shipments for more attention by the authorities, can reduce delays associated with opening every single shipment at the border as if they were all of equal concern.

Quantity Control Measures

Traditional quantity control measures are less common in international trade than previously, especially since the phasing out of the Agreement on Textiles and Clothing in 2005. The provisions of GATT 1947 are meant to rule out most quantitative restrictions except in the case of balance of payments emergencies. Nonetheless, NTMs of other types often have practical effects resembling quantitative restrictions, such as policies of non-automatic licensing, or exemptions from strict product standards up to a certain quantitative limit, which in effect act as a quantitative limit at the exemption level.

Quantitative restrictions can in principle be designed to mimic the effects of tariffs, limiting imports or raising import prices by a comparable amount. In practice, though, their economic effects are different. In the case of a tariff, the rents resulting from import restriction are received by the importing country's government, while in the case of a quota they accrue to the holder of the license to import, unless these licenses are auctioned off. Similarly, in cases where supply and demand are variable, quotas can contribute to price volatility in excess of what would be observed under a tariff which allows some of the variability of market conditions to be manifested in changes in import quantities.

Trade Remedies

Antidumping duties and countervailing duties (AD/CVD policies) often appear in catalogues of NTMs, as do trade safeguards. These measures are forms of

administered protection codified in the WTO agreements, largely following historical precedents in US law. Antidumping policies allow the imposition of duties upon the finding of 'unfair pricing' (usually, a price lower than the price charged in the exporter's home market) coupled with a finding that the dumping is causing material injury to the competing domestic industry or is threatening to do so. Countervailing duties can be charged against subsidized imports that are found to be harming domestic producers. Temporary safeguard measures can be imposed if a country's domestic industry is injured or threatened with injury as the result of a surge in imports.

The various categories of trade remedy policies have been the subject of significant controversy. A finding of unfairly priced imports is often easier to obtain than a finding of predatory pricing under domestic antitrust law, even though the rhetorical descriptions of dumping and predatory pricing often sound similar. However, from the standpoint of quantitative analysis, AD/CVD policies can often be analysed with traditional tools. As price control measures, the economic analysis of AD/CVD policies is similar in many respects to the analysis of tariffs, though their administration raises some additional points for analysis. Safeguard measures can be implemented either by tariff-like policies or by quantitative restrictions.⁵

Rules of Origin⁶

In the strict sense, rules of origin are part of tariff policy, but they are often classed among NTMs for their potential to influence trade in a way not readily apparent from a simple examination of the published tariffs. Rules of origin are particularly important in the case of free trade agreements, customs unions or other preferential arrangements. If country A and country B each decide to grant imports from the other duty-free treatment, then it is necessary to have rules to determine whether such imports in fact originate in either A or B, as opposed to in country C, whose imports are intended to pay an MFN duty but which might be simply transshipped through A to B and relabelled 'Made in B'. Rules of origin may be based on a change in tariff classification, a percentage of value originating in the free-trade area, or a technological transformation criterion (for example, the 'yarn forward' rule in the North American Free Trade Agreement (NAFTA) requiring that the yarn, fabric and garment all be made in North America for a garment to qualify for duty-free status).

Rules of origin tend to vary greatly from product to product within the tariff code, requiring specialized legal attention and tracking of materials within the production process to insure compliance. For sectors such as textiles, apparel and autos, rules of origin can have significant impact on trade flows. Rules of origin

⁵ For a more detailed discussion of antidumping and other commercial instruments, see Chapter 6.

⁶ For a detailed examination of the economic effects of rules of origin, see Cadot et al. (2006).

can raise the cost of production, since more costly inputs satisfying the rule may be substituted for cheaper inputs outside the region in question in order to qualify for a duty reduction. Rules of origin can also serve as a form of subsidy to exports, since they may promote trade in higher-cost inputs within a free trade area. Failure to take rules of origin into account may lead to overestimates of the trade-creating effects of a free trade agreement.

Multiple NTMs and the 'Whack-a-Mole' Problem

Countries wishing to restrict the import of particular goods often use multiple methods to accomplish this objective. For example, high tariffs, restrictive SPS and TBT rules, non-automatic licensing and complex rules of origin may all be applied to the same product. This creates a problem for exporting firms, or national negotiators acting on behalf of such firms, trying to achieve market access. When one impediment is satisfied or negotiated away, another may arise to take its place, thus frustrating attempts at entering the market. This problem is often referred to as the whack-a-mole problem, after the children's arcade game in which a rubber mallet is used to bang down the heads of rodents which keep popping up again.

The existence of multiple NTMs for the same product also creates challenges for economic analysis. It may be possible to estimate a total amount of market distortion associated with NTMs, in terms of high import prices or low import quantities. However, it is not obvious how to assign partial effects of such a market distortion to different NTMs. It could be that each contributes a part of the distortion, that all must be removed to have any impact on the market at all, or that only one out of the multiple NTMs is truly binding. This makes it more challenging to provide policymakers with appropriate guidance on which of the multiple policies to prioritize in negotiations.

Quantifying the Effects of NTMs⁷

Potential Importance

While there are no global estimates of the effects of NTMs, several available partial estimates suggest that their impact on global trade is large. Andriamananjara et al. (2004) estimated that removal of certain categories of NTMs could have yielded global welfare gains of US\$90 billion in 2001. This estimate involved compiling an inventory of NTMs that might have potentially affected trade, quantifying their

⁷ See Deardorff and Stern (1998) and Ferrantino (2006) for more detailed treatment of quantification of NTMs. This discussion is adapted from Ferrantino (2010), which also contains a discussion of sources of data for the quantitative analysis of NTMs.

effects on prices using econometric methods and simulating the effects of removing the resultant price gaps in a CGE model. A recent study of NTMs affecting EU–US trade and investment estimates that an ambitious programme of NTM reduction and regulatory convergence would generate short-term real income gains of about US\$85 billion and longer-term gains of US\$210 billion (Berden et al. 2009).

A few studies also attempt to quantify the effects of NTMs relative to tariffs, usually finding that NTMs are relatively more important. Fugazza and Maur (2008) report that in 14 of 26 global regions, the *ad valorem* tariff equivalent of NTMs calculated using the results of Kee et al. (2009) is higher than the average tariff. In studies focused on particular products and markets, the impact of NTMs is often found to be as high as, or higher than, that of tariffs. For example, the impact of SPS measures on US beef exports from 2004–2007 (US\$11 billion) has been estimated to be almost twice the impact of tariffs and tariff rate quotas which are estimated to be US\$6.3 billion (USITC 2008). In another study focusing on US agricultural exports to India, the effects of removing India's NTMs on US exports were found to be in about the same order of magnitude as those removing India's tariffs (USITC 2009). The results were dominated by the effects on a single product, wheat, for which NTMs cut off trade completely.

Price Gaps versus Quantity Gaps

Non-tariff measures, if they have an impact in the marketplace, are likely to reduce the quantity of imports, increase their price, or both. Measures of the quantity or price effects of NTMs can be used to compare the degree of distortion for one product with another, or for the same product in different countries. Such measures of distortion can also be introduced into simulation models to estimate effects on welfare, GDP or inter-industry effects.

For purposes of simulation modelling, it is often convenient to express these effects as price gaps or tariff equivalents. The difference between the high price of imports induced by the NTM and the lower or 'world' price that would prevail in the absence of distortions can be treated as a tariff equivalent. Tariff equivalents have the advantage of providing easy comparisons between NTMs and tariffs. The removal of NTMs can be simulated in a partial equilibrium or CGE framework using familiar methods for simulating the effects of tariff changes.

One can also measure the quantity or value effect⁸ of NTMs or other import restraints as the difference between the observed (lower) imports under the NTM and the higher level of imports that would have been observed without the NTM.

⁸ While ideally one would like to contrast quantity gaps with price gaps, in practice what are often estimated as quantity gaps are really value gaps, in which the analyst contrasts the dollar value of imports constrained by an NTM with a normal value. This is no doubt because data on trade values are more easily obtained than data on trade quantities (such as number of units, kilogrammes). Since value = quantity*price, analysis based on values may be influenced by variations in the level of prices, across trading partners or across time.

This requires the analyst to estimate a level of 'normal' imports in the absence of the NTM. One widespread technique for doing this is gravity modelling. It is well known that a high degree of the variation in the value or volume of trade between partners can be explained by the size of economies of the trading partners (more trade between partners with higher GDPs) and by the economic distance between partners (less trade between more distant partners, more trade between partners sharing a common border or a common language). Estimates of the gravity model can be used to generate out-of-sample estimates of what normal trade would be between country pairs for which the trade value is usually lower.

There are several reasons for preferring price gaps to quantity gaps in most cases. First, price gaps measure the difference between two observed values, a distorted (NTM-ridden) price and a non-distorted price. Quantity or value gaps measure the difference between an observed (distorted) value and an estimated normal value of trade, and are thus influenced by the quality of the estimated value, which is subject to the various uncertainties surrounding econometric specifications. Even when price gaps are 'mass-produced' using an econometric framework, such as the one presented by Dean et al. (2009), the econometric properties of these estimates are likely to be preferable to estimates of quantity gaps, since there is generally less cross-country variation in prices than in trade flows (Ferrantino 2006: 20, Annex 2).

Quantity gaps may be preferred in cases where the NTM is prohibitive and stops trade altogether. In such cases, there is no price of imports on which to base a price gap. They may also be used in cases where trade data are relatively abundant and prices are difficult to measure, for example for highly differentiated products of the same general type.

Cost–Benefit Analysis

Many NTMs arise from regulatory policies which are intended to provide benefits to consumers and producers, and not simply to be trade-restrictive. In many cases, they provide benefits such as protecting food from contamination, crops from disease, electronic devices from electromagnetic interference, and so on. The design of regulatory policies to achieve a set of stated objectives, while at the same time minimizing distortion of trade patterns, is a matter of ongoing interest for both policymakers and researchers.⁹ A further implication of the regulatory nature of NTMs is that the relevant counterfactual for policy analysis may not be to eliminate the policy altogether, but to replace it with a policy which achieves the same regulatory objective with a less trade-distorting effect.

Analysts examining such policies from both the regulatory and the trade perspective may wish to explore cost–benefit analyses which weigh the potential

Analysis based on values is often reported as if it were based on quantities, making the unstated assumption that prices are constant in the relative dimension.

⁹ This point is a recurring theme of an analysis of NTMs affecting EU–US trade recently commissioned by the European Union (Berden et al. 2009).

regulatory benefits to producers and consumers against any trade-distorting effects. Recent progress has been made in identifying appropriate theoretical frameworks for different special cases for agro-food trade (van Tongeren et al. 2009). Gathering appropriate data is especially challenging in this area. The required information on the policies themselves may often go beyond what is currently provided in official data. Also, the measurement of benefits is particularly challenging, though recent advances in experimental economics with respect to the willingness-to-pay approach appear to offer promise in some cases (van Tongeren et al. 2009).

Supply Chain Analysis

Appropriate price comparisons for NTM analysis require the identification of a point in the supply chain where prices are to be compared. When there are multiple policies present, a single estimated price gap summarizes their effects but does not provide information on the effects of individual policies. Supply chain analysis offers potential for disentangling the effects of multiple policies.

The movement of goods from the exporter to the ultimate consumer involves numerous transactions costs, which take the form of markups. Anderson and van Wincoop (2004) suggest that the typical cost increase for developed country exports between the factory and the retailer is approximately 170 per cent. In many cases the markup from factory to consumer may be even higher. Feenstra (1998), citing Tempest (1996), reports data which imply that the markup on Barbie dolls produced in China and sold in the United States is approximately 900 per cent.

Thus, any comparison of distorted and non-distorted prices needs to specify at what point in the supply chain the price comparison is being made. If the non-distorted world price is measured at a different point in the supply chain than the distorted price affected by NTMs, corrections need to be made for those transport costs, tariffs and wholesale and retail markups which are added at each point of the movement of products. Products move from the farm or factory to the port of exportation, are loaded onto ships or planes, move internationally by ocean or air, are unloaded at the port of importation, pass through customs where tariffs may be charged and move into the internal distribution system in the importing country where they are subject to wholesale and retail markups.¹⁰

It is often the case that the difficulties faced by traders attempting to export or import goods consist of multiple policies applied to the same transaction, or to a mix of official and private practices (see Tilton (1998) for a case study of the whack-a-mole problem in Asian cement trade). The classic price gap or tariff-equivalent method is only able to express the summary effect of all policies in place, and is not able to apportion the effect among multiple policies.

¹⁰ Some formulae that can be used for breaking down the various markups in the supply chain can be found in Ferrantino (2006; Annex 1), which follows closely Deardorff and Stern (1998; Appendix 3).

A supply chain perspective can help in the analysis of multiple NTMs. By isolating the individual locations in the supply chain where different policies can take place, it may be possible to obtain a better understanding of which policies act as absolute constraints and which are not constraining, but may increase costs. Breaking down the supply chain is especially useful for the analysis of trade facilitation as well. For example, the process of importation in a seaport can be broken down into a number of steps (Londoño-Kent and Kent 2003). Survey instruments can also be designed from the perspective of the costs or time associated with different parts of the supply chain.¹¹

Measuring the impact of NTMs is never going to be easy, but given the growing importance of such measures it is a task that will require continued attention.

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¹¹ Examples of this include the ‘Trading across Borders’ component of the World Bank’s Doing Business surveys (available at: www.doingbusiness.org), and the survey of logistics impediments in USITC (2005).

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