

Analytical Approaches to Quantifying Economic Effects of Non-Tariff Measures

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ABSTRACT: While it is increasingly suspected that non-tariff measures (NTMs) may now have a greater impact on world trade than on tariffs, the economic analysis available to policymakers continues to focus on tariff reductions. This paper discusses reasons for this “analysis gap” and describes the current state of knowledge in the hope of promoting better dialogue between the producers and users of analysis. The role of economic analysts is different than policymakers. The quantification of NTMs is inherently more difficult than that of tariffs. In some cases, it is useful to proceed by analogy and attempt to obtain “tariff equivalents” of NTMs, in other cases this is less useful or productive. The existence of multiple NTMs on a single product further complicates the analysis. The necessity for detailed institutional and market information causes estimates of the effects of NTMs to be “handcrafted” rather than mass-produced in the way estimates of tariff effects are.

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As tariffs have been progressively negotiated downward in seven rounds of GATT negotiations as well as through bilateral and plurilateral agreements like NAFTA, the Canada-U.S. Free Trade area and others, it has become increasingly apparent that policies other than tariffs which limit international trade are increasingly important. One measure of this is the proliferation of topics other than tariffs which are covered in “new-style” trade agreements – services, investment, competition policy, intellectual property, government procurement, standards (including sanitary and phytosanitary standards), customs procedures and trade facilitation, and so on. The list is not standard, and varies depending on the forum and the discussion taking place, but suffices to illustrate the point that the topic of tariffs barely scratches the surface of the subject matter contemporary trade negotiations is expected to address.

As well, economists continue to note that there are substantial differences in prices even between countries that apparently trade with each other on a close-to-tariff-free basis. Among the industrial economies alone, only a small share of traded goods bear a duty of more than 5 percent, and these are concentrated in agriculture and textiles-apparel. Nonetheless, OECD data cited by Bradford (2001) reveal that among a group of eight advanced industrial economies¹, the gap between the highest and the lowest average prices is substantial. – 65 percent for an index of raw agriculture, forestry, and fisheries prices, 68 percent for motor vehicles, 110 percent for processed foods, 194 percent for leather products, 235 percent for tobacco, and 433 percent for petroleum and coal products. Comparisons of city-level retail prices in the Economist Intelligence Unit’s EIU CityData database covering both industrial and developing economies, as recently analyzed by Hufbauer et al. (2002) tell a similar story.

All of this suggests that the benefits of international trade, which are supposed to come largely from providing consumers the benefits of cheap goods in distant locations,² are nowhere near being fully realized as of yet. Although the price differences just mentioned look way too large to be attributed to tariffs, it would be a mistake to automatically say they are all caused by non-tariff policies which inhibit trade. Transport costs (both international and internal), wholesale/retail margins, excise taxes, and costly information all play a role. But somewhere in those price differences is evidence that liberalization of non-tariff measures could play a substantial role in changing trade patterns and causing prices to equalize. Of course this will be a lot bigger for some products than others, and in some countries than others.

This gives rise to the hope that economists can be tasked to find out *which* products in particular are particularly affected by non-tariff trade measures, and in *which* countries, so as to reveal to negotiators (and to traders trying to get the attention of negotiators) where the biggest “bang for the buck” would be in terms of liberalization. Our attempts to do this so far are still in their infancy. In the remainder of my remarks I am going to discuss six principles of quantification of non-tariff measures which are designed to both to focus expectations of what economists should and should not be

¹ Australia, Belgium, Canada, Germany, Japan, the United Kingdom and the United States.

² Or, of providing high-quality goods available in distant locations. This is of course more difficult to measure than price; but if cheapness is being provided this imperfectly, probably quality is as well.

expected to be able to tell policymakers and traders about these matters at this point in the state of knowledge, and to indicate to policymakers and traders in what areas they could reasonably expect economists to tell them more.

For readers interested in a “how-to” manual on methodologies, there are several good surveys available which cover that ground for the interested reader.³ I want here to suggest enough of the flavor of the issues involved so that the customers of economic analysis on non-tariff measures can hold an informed conversation with the providers of analysis.

I. The Economic Analyst Has A Different Job Than The Policymaker, Negotiator Or Trade Lawyer.

Economists are best suited to identifying the economic effects of border measures, addressing questions like “Does this policy raise prices, and by how much?” or “Does this policy reduce exports and imports, and by how much?” (As we shall see, these are two complementary but not identical ways of looking at the same question). Policymakers, negotiators, and trade lawyers often deal with important questions related to non-tariff measures which are either outside the economist’s brief, or related to it in a less direct way. These include the following:

- What is the appropriate forum for negotiating these policies?

For example, the non-agricultural market access (NAMA) negotiations in Cancun reference both tariff and non-tariff barriers. There are other parts of the Doha Development Agenda that address such topics as investment, services, competition policy, trade facilitation, government procurement, and so on. When a specific issue is brought up, there is a question of what forum to direct it to. An economist may very well reason that if there are a number of different policies which might raise prices in the importing country, or reduce trade, they can be addressed with the same tools and ought to be talked about all at once – but this may be inconvenient or impractical from a negotiator’s standpoint. The communication issue that this can give rise to is that the negotiator may only ask for analysis of issues that fall under a certain rubric, which to the economist may think are interrelated in terms of their market effect with issues that fall under other rubrics.

- Is a given policy WTO-legal or not, and should we call it a “non-tariff barrier” (NTB) or a “non-tariff measure” (NTM).

Economists, especially if they are less experienced at providing information to customers in the policy apparatus, are likely to treat “NTB” and “NTM” as synonyms. Although there is no standard dictionary I know to look this up in, the policies tend to be called “NTBs” when the speaker wishes to emphasize either that there is a commitment to negotiate them away or that the policies fall afoul of previously

³ These include but are not limited to Deardorff and Stern (1997), Bora, Kuwahara, and Laird (2002), and on standards issues particularly, Maskus, Otsuki and Wilson (2001).

negotiated commitments, and “NTMs” when the participants in the discussion wish to hold open the possibility that the policies may be consistent with commitments made or serve some other legitimate domestic objective, even though they may reduce trade flows. This distinction is very important for negotiators and trade lawyers at dispute settlement, and your economist is best served if he or she is told what the acceptable usage is in a particular context. It should also be clear that the economist may estimate sizable economic effects for policies which the customer views as WTO-legal, not in play at negotiations, or whatever, but those matters are usually outside the direct responsibility of the analyst. Observing the division of labor between the generator and user of the analysis can smooth the flow of information and generate more usable information.

- If the policy restricts trade, but also serves some domestic purpose, then whether it is allowable or not, is it efficient in some overall sense? That is, is the stated domestic purpose being served to a sufficient degree that it justifies the trade-restrictiveness of the policy? Is there another policy which is less trade-restrictive that might serve the stated domestic purpose equally well or better?

For questions like this, economists may actually have something to contribute to policymakers, and it is worthwhile to ask them. They can generate a lot of useful information about the tradeoffs involved in policy choices. The policymaker should be aware that good information often ends up with an “apples and oranges” comparison at the bottom line – safety, health, employment security, or whatever may be in one side of the balance, and exports and imports, real incomes, or GDP may be in the other side. In that case, the value judgments to be applied should come from the policymaker rather than the economist.

II. The Economic Effects Of Non-Tariff Measures Are Often Harder To Quantify Than Those Of Tariffs

Economists have produced a large number of estimates of the economic effects of the Uruguay Round, NAFTA, and other trade agreements. These estimates tend to be dominated by estimates of the effects of tariff reduction. Thus there is an “analysis” gap – the suspicion that non-tariff measures may be more widespread and important than tariffs coexists with the fact that the bulk of the usable quantitative analysis available to policymakers is about the effects of further tariff reductions.

The reasons for this are fairly straightforward. Tariffs themselves are numerical in nature, and so they can be more easily incorporated into numerical models, whether of the simulation type or the econometric type. It is still more of a challenge than one might think to do this when the tariffs are not of the *ad valorem* but of the specific type (e.g. 5 percent plus \$10 a barrel) or if they are two-part tariffs of the tariff-rate quota type, with a low rate in-quota and a higher rate over-quota, but there are approaches that can be made to all these problems.

Non-tariff measures by their nature do not come specified as quantities but simply as the knowledge that some policy or other exists. Of these, the easiest ones to quantify are quantitative restrictions, which in their traditional form have virtually disappeared since the Uruguay Round, but which have been succeeded by tariff-rate quotas and voluntary export restraints (such as those in the Agreement on Textiles and Clothing) which have a lot of similarities computationally to quantitative restrictions in that a certain volume of imports is specified either directly or as the level above which a (possibly prohibitive) high tariff kicks in. However, policies such as standards and inspection policies, inefficient customs procedures, and so on, do not automatically come with either a price or a quantity number attached to them. This leaves the analyst with the job of estimating what the trade flow or the import price *would have* been in the absence of the policy. Such an estimate, however carefully crafted, remains an estimate subject to both statistical uncertainty and to changes in the assumptions, methodology and data employed.

This is not to say that analyses of tariff changes are not also subject to choices about methodology, assumptions, and data that can influence the results. They are. But a larger number of these choices must be made in estimating the effects of non-tariff measures, so the caveats and cautions surrounding any available estimates should be correspondingly greater.

III. Thus, It Is Often Helpful To Think Of Non-Tariff Measures As Being Something Like Tariffs

As just mentioned, economists have a number of modeling frameworks that provide estimates on the effect of tariff changes on economic variables such as trade flows, output of different industries or sectors, changes in prices and employment in different industries, and measures of national income or economic welfare. Frequently employed are simulation frameworks, which can either look at one industry or product at a time (“partial equilibrium”) or all the industries and products in a national or global economy simultaneously (“general equilibrium”), which takes account of their interconnections but requires more data and model maintenance. The largest models are now routinely maintained and updated, so that for practical purposes the policymaker has on call representations of the global economy at the level of detail of perhaps two dozen regions and several dozen sectors, in which the focus of fine and broad detail can be custom-tailored for the particular question at hand, so that brand-new systems of thousands of equations can be built fairly rapidly on the desk top (“show me in particular the U.S.-Chile relationship, and trade in fisheries and beverages, and leave Chinese steel in the background somewhere”) in ways that were impractical or very costly ten or even five years ago.

The power of these analytical tools can be employed in the analysis of non-tariff measures as well, if only they can be rendered as “tariff equivalents.” This means attempting to obtain an estimate of the level of the *ad valorem* tariff that would have

the same effect on prices and quantities as does the non-tariff policy in question. Immediately this focuses the analytical task and in many cases renders it much more tractable.

This may sound like choosing a methodology based on the principle that if you only have a hammer, every problem looks like a nail, or searching under the lamppost because the ground is better lit even when the car keys are somewhere else. The reason for wanting estimates of tariff equivalents of non-tariff measures is not only because we have good tools for analyzing tariffs, but because we think as economists that if trade is really being restricted, then prices paid in the importing country are really likely to be higher than they otherwise would have been, and therefore price differences are the analytically appropriate place to look for an effect of the policy in question. Having tariff equivalents also makes it easier to compare policies on different goods in different places to get an idea of where the barriers may be the most severe.

IV. Sometimes It Is Less Helpful To Think of Non-Tariff Measures As Being Something Like Tariffs

While the tariff equivalent looks very much like a one-size-fits-all measure for evaluating the effects of non-tariff policies, sometimes it is not the most appropriate tool to use. Even when in theory one ought to be able to obtain a tariff equivalent, it is not always easy to calculate. The analyst may look at alternatives to tariff equivalents in several cases. Two examples (not exhausting the possibilities) are:

- When the main effect of the policy operates through a channel other than restricting trade and raising prices at the border.

In many cases, the policies of interest may operate by means of preventing the entry of foreign establishments into the market, rather than by border trade. In the case of services, this is what is meant by a restriction on GATS Mode 2; however, restrictions on direct investment to produce goods operate in the same way, whether they take the form of direct restrictions on entry, balance-of-payment type restrictions, restrictions on domestic content of labor hiring, or other restrictions. In any of these cases, merchandise trade may be affected indirectly, but it is the limitation on foreign-owned production which is essential. Attempting to understand and model the investment or foreign production activity directly, rather than treating the limitation as if it were a limitation on the border trade, is indicated. Economists at the Australian Productivity Commission have made significant progress in this direction (Dee and Hanslow)

- When the main effect of the policy operates through raising the costs of production, or causing the domestic product to be differentiated in some way from the foreign product.

In the case of standards (including sanitary and phytosanitary standards) the immediate effect of the standard may be to raise production costs. If only “high-quality” products are permitted to enter the market when some consumers may willingly buy “low-quality” products at a lower price, then one can think of the standard as operating by causing imported goods to bear an additional cost of production in order to meet the standard and enter the market. Strictly speaking, such a cost ought to be thought of as an excise tax rather than as a tariff, though one might approximate its effects as a tariff equivalent.

Alternately, the exporter may go on trying to sell the same type of product they would have sold otherwise, but less of it is exported because the standard is imposed at the border. Then, the analyst is faced with the problem that the imported good and the domestic good are of different varieties, and their prices may not be comparable.

In such a case it may be possible to evaluate the effects of the policy by looking directly at the effects on trade flows rather than the effects on prices. The actual, restricted imports can be compared with an estimate of the imports that would have occurred had the restriction not been in place. This usually involves making some sort of comparisons with third markets – either crudely, by assuming the same market share as in another market, or by more sophisticated econometric methods such as gravity modeling.⁴

In principle, quantity estimates should be “just as good” as price estimates, because an effective trade restriction both raises prices and reduces trade flows. It may also be that what the policymaker really wants is to know how much trade is being restricted by, and the quantity estimate appears to answer this directly, while estimating a tariff equivalent only yields information about trade flows if it is plugged into a model of trade flows. However, while price estimates may be based on direct comparisons of two real prices, quantity estimates are based on a comparison of an actual trade flow with a hypothetical trade flow, and the estimate of the trade that “would have” taken place in the absence of the barrier is unavoidably sensitive to a number of choices made by the analyst, and thus often subject to a higher degree of uncertainty.

- When the data necessary to estimate the tariff equivalent are not available in sufficient quantity or quality.

⁴ Gravity modeling operates by taking advantage of the fact that trade flows tend to be larger between larger trade partners and smaller in trade partners which are separated by physical, economic, and cultural distance. It takes its name from the analogy with the Newtonian theory of gravitational force, which is proportional to mass and inversely proportional to distance. See Frankel (1997) for a practical overview of the use of gravity modeling in assessing trade policy.

As noted above, there are factors other than border policies which can cause retail prices in the importers' market to exceed the production cost in the exporters' market. One of these factors is transportation cost, both internationally and internally in the export market (ex-factory to port) and in the import market (port to point of sale). Another factor is wholesale and retail markups in the import market. In principle, once a price gap between the two markets has been identified, both the transport costs and the wholesale-retail markups ought to be subtracted out of it to obtain the true tariff equivalent.

Data on international transport costs is sometimes available, but may vary across trading partners or by modes of shipment (e.g. air versus water). Data on internal transport costs are harder to come by; moreover, there will usually be multiple factory locations and points of sale. Data on the wholesale-retail markup is in many cases the most difficult to obtain. The best estimates of tariff equivalents of non-tariff measures devote a great deal of care to identifying these data elements. However, in many cases the transport and wholesale-retail margins must be estimated by crude assumptions, and in some cases the assumptions necessary may be sufficiently unsatisfying as to push the analyst into a quantity approach rather than a price approach.

V. Multiple Non-Tariff Measures on the Same Product Can Have A Cumulative Effect., Which Is Not Additive

It is often the case that countries which have a systematic policy of reducing or excluding certain kinds of imports have multiple policy tools for achieving this goal. Suppose that using the best available methodology, we determine that buyers in country X must pay 50 percent more than the world price for a certain type of good. Suppose we also know that country X simultaneously employs standards policies, licensing requirements for the foreign exchange necessary, minimum import prices, and cumbersome customs procedures, which all interact in such a way that imports of the good are effectively prevented. The policymaker may wish to know how much of the 50 percent markup is attributable to each of these four policies. In point of fact, however, all of the policies may be mutually reinforcing, such that removing one of them only would have no discernible effect on market conditions.

An example provided by Tilton (1998) illustrates this point, as well as the way in which private anticompetitive practices can affect markets. Though it involves a non-agricultural product, cement, numerous similar examples from agriculture and food products could probably be identified. Koreans attempting to sell cement in Japan faced multiple group boycotts. Construction trade associations agreed to buy cement only from members of the national cement association. This association refused to supply any cement to firms that purchased any imported cement. The government, a major buyer, also refused to buy any imported cement. The longshoring companies refused to unload imported cement that was not directly authorized by the government. Similarly,

the domestic cement manufactures pressured trucking firms not to carry cement imports. Other threats were used to prevent foreign cement firms from acquiring domestic firms.

When an order for imports had actually been made, domestic manufacturers refused to permit the use of any of their storage silos. The exporter tried to build its own storage silo, but the government refused to sell harbor land, and insisted on separate and costly weighing and testing procedures only applicable to imports. Eventually, the domestic competition authorities fined to domestic cement industry for price fixing but overlooked the boycott on imports.

This case illustrates the point that private anticompetitive practices (which could be attributed to failure to enforce competition statutes) can be reinforced by restrictions on imports, and that other government actions (regulatory and procurement decisions) can serve to reinforce a private import-restricting practice that the government does not directly participate in.

VI. There Is No Substitute For Product- and Measure-Specific Institutional Information

This point, which has been made articulately by Deardorff and Stern (1997), has been illustrated in several ways in the discussion above. It is important to make because at the bottom it identifies the fundamental cause of the “analysis gap” on non-tariff measures – we think they may be widespread and more important than tariffs, but there are many more usable estimates available of the effects of tariffs than of non-tariff measures.

The “analysis gap” arises because the tools to analyze tariffs are highly fungible – a border tax is a border tax, and once you’ve analyzed country X’s tariff on semiconductors, you can analyze country Y’s tariff on tomatoes, particularly if they’re both *ad valorem*; it is just a matter of using different numbers, and it is not necessary to know anything in particular about the difference between country X and country Y, or the difference between semiconductors and tomatoes.

For non-tariff measures, however, it is necessary to know a lot of things in order to really do the job right – how many different policies are operating simultaneously? How does each policy operate? How is the good transported? What institutions influence its method of sale, which may affect the wholesale-retail markup? And so on. The analysis of non-tariff measures is thus definitely not “one-size-fits-all,” and the mass production of estimates which is feasible for tariff cuts gives rise to the piecemeal production of “handicraft” estimates of different non-tariff policies in different countries, which may or may not be directly comparable, and which do not add up to a universal database of the economic effects of non-tariff measures. Nonetheless, the question, “What *is* the economic effect of non-tariff measures, anyway?” is still a reasonable one, and with sufficient patience and application, policymakers and analysts can move

forward to obtain answers of increasing usefulness, precision, and comprehensiveness.

REFERENCES

Bora, Bijit, Aki Kuwahara and Sam Laird (2002), "Quantification of Non-Tariff Measures." UNCTAD Policy Series in International Trade and Commodities, Study Series No. 18 (UNCTAD/ITCD/TAB/19), New York and Geneva: United Nations Conference on Trade and Development..

Bradford, Scott (2001), "Paying the Price: The Welfare and Employment Effects of Protection in OECD Countries," processed, Brigham Young University. (cf. also Robert Z. Lawrence and Scott Bradford, *Paying the Price: The Cost of Fragmented International Markets* (forthcoming October 2003), Washington, D.C., Institute for International Economics.

Deardorff, Alan V., and Robert M. Stern (1997), "Measurement of Non-Tariff Barriers," OECD Economics Department Working Papers No. 179 (OCDE/GD(97)/129), Paris: Organization for International Cooperation and Development.

Dee, Philippa, and Kevin Hanslow (2000), *Multinational Liberalisation of Services Trade*, Productivity Commission Staff Research Paper. Canberra: Ausinfo.

Frankel, Jeffrey A. (1997), *Regional Trading Blocs in the World Economic System*. Washington, D.C.: Institute for International Economics.

Hufbauer, Gary Clyde, Erika Wada and Tony Warren (2002), *The Benefits of International Price Convergence: Speculative Calculations*. Washington, D.C.: Institute for International Economics.

Maskus, Keith E., John S. Wilson and Tsunehiro Otsuki (2001), "Quantifying the Impact of Technical Barriers to Trade: A Framework for Analysis," Washington, D.C., World Bank.

Tilton, Mark (1998), "Japanese Group Boycotts and Closed Government Procurement Procedures as Barriers to Trade," in U.S. International Trade Commission, *The Economic Implications of Liberalizing APEC Tariff and Nontariff Barriers to Trade*, Publication 3101 (April), Washington, D.C., U.S. International Trade Commission.