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Protectionism indices for non-tariff measures: An application to maximum residue levels ☆

Yuan Li [a], John C. Beghin [b,*]

[a] T-Mobile, USA
[b] Iowa State University, USA

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ABSTRACT

We propose aggregation indices of Non-Tariff Measures (NTMs) to quantify their protectionism relative to international standards of stringency. We apply the indices to national Maximum Residue Limit (MRL) regulations on pesticides and veterinary drugs affecting agricultural and food trade and using a science-based criteria embodied in Codex Alimentarius international standards. The approach links two streams of the NTM literature, one concerned with the aggregation of various NTMs into operational indices for econometric and modeling purposes, and the other attempting to evaluate the protectionism of NTMs. The data used in the application come from a large international dataset on veterinary and pesticide MRLs and CODEX MRL standards for a large set of countries.

Introduction

We fill a gap in the literature on empirical measures of protectionism of nontariff measures (NTMs) by proposing simple yet formal aggregation indices of NTMs. The indices measure the protectionism of Maximum Residue Limit (MRL) standards relative to science-based criteria embodied in international standards such as Codex Alimentarius. MRLs set limits on harmful substances, like pesticide residues, veterinary drug residues, and other harmful substances, that importing countries allow on similar imported and domestic products as implied by national treatment. MRLs are often substance, product, and country specific. Countries have a legitimate right to set science-based MRLs in presence of harmful risk. MRLs can also be used to impede trade to protect domestic producers rather than protecting health or the environment.

We link two streams of the NTMs literature, each addressing a specific problem. These two problems have been vexing and remain largely unresolved. One stream is concerned with the aggregation of various NTMs into meaningful indices, to characterize NTM regimes and to be used in econometric analyses of trade flows or to model and analyze policy impact (Disdier et al., 2008). The other stream attempts to evaluate the protectionist nature of NTMs. Unlike tariffs for which the presumption is that they distort trade and welfare, NTMs may improve welfare (improvement in economic allocation of resources) because they address some market imperfection (Beghin et al., 2012). So quantification, aggregation, and delineation of the potential protectionism of NTMs are a complex and important issue in the analysis of NTMs.

Empirical studies of NTMs almost inevitably involve quantification and aggregation of several policies. Unlike tariffs, a single policy type whose numerical values can be directly used and interpreted, NTMs cover a lot of intrinsically different policies. For example, a Multi-Agency Support Team (MAST) of international organizations proposed a classification of NTMs, which consists of 16 major categories, including Sanitary and Phytosanitary (SPS) measures, Technical Barriers to Trade (TBT), other technical measures, price control measures, quantity control measures, etc. These NTMs can be qualitative and/or quantitative standards. For qualitative standards, like labeling, no numerical values can be directly used. Further, these qualitative policies affect different components of cost of production and marketing and cannot be easily aggregated into a single price equivalent. Evaluating the protectionist component of these numerous

☆ Yuan Li is a statistical consultant and economist at T-Mobile. John Beghin is Marlin Cole Professor of International Agricultural Economics in the Economics Department and the Center for Agricultural and Rural Development at Iowa State University. This paper is based on the second essay of Li's dissertation. The MRL data and computations in this version of the manuscript have been updated in spring 2012. We thank two referees and Editor Satoru Shimokawa for comments on an earlier draft of the manuscript, and Dermot Hayes, David Hennessy, John Schroeter, and Bo Xiong for comments and discussions. The usual disclaimer applies. Beghin acknowledges support from the Marlin Cole Fund at Iowa State University. The score data is available from the authors upon request.

* Corresponding author. Address: 383 Heady Hall, Economics and CARD, Iowa State University, Ames, IA 50011-1030, USA. Tel.: +1 515 294 5811; fax: +1 515 294 0221.

E-mail address: beghin@iastate.edu (J.C. Beghin).

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qualitative policies into a protectionist score is likely to remain a challenge. For quantitative NTM policies, we show that aggregation is a much more manageable task.

Individual NTMs have been used empirically in a disaggregated fashion (Disdier and Marette, 2010; Wilson and Otsuki, 2004). For qualitative standards, dummies are usually used to indicate the existence of such a standard. For quantitative standards, like Maximum Residue Limits (MRLs), the numerical levels may be directly used in the model (Xiong and Beghin, 2012). However, a single disaggregated NTM has limited application. Usually, a myriad of standards work together to regulate the quality of a product, and picking just one of the NTMs may lead to subjective selection bias and a mischaracterization of the set of NTMs regulating the market under study. In addition, even if there is no bias, a single NTM is not exhaustive and may not be representative.

Based on that concern, researchers often aggregate regulations and standards in summary indicators (Winchester et al., 2012). Indices involve aggregating over different regulations and standards, like labeling and MRL, and/or aggregating over products of different importance. Indices have their own drawbacks, especially when they aggregate heterogeneous policies. Their interpretation may be difficult. The estimated impact of the index on trade cannot be traced back to a particular instrument type or policy and policy prescriptions are infeasible. Recent investigations focus on measuring the heterogeneity of NTMs regimes across countries and products. Kox and Lejour (2006) propose an index based on a binary indicator of NTMs similarity. Rau et al. (2010) developed a heterogeneity index of trade (HIT) of NTMs that can be applied to binary, ordered, or quantitative NTMs. The HIT is non-directional which means it measures the bilateral dissimilarity of NTMs, but gives no information about the relative strictness of NTMs. This is a drawback as countries could be dissimilar by being more or less stringent and because the relative regulatory environment could be different (lax or stringent environments presumably easy or rather difficult to meet as it is increasing costly to meet stringency at the margin). Winchester et al. (2012) extend the HIT, to a directional HIT (DHIT) capturing the asymmetric stringency between two countries and apply it to MRL data in an investigation of bilateral trade of agricultural products. This is an improvement over the HIT as trade presumably flow more easily from more stringent locations to less stringent destinations rather than the opposite. Still the drawback about the relative lax or stringent regulatory environments remains; a difference of 5 ppm around a 50 ppm MRL is different from a 5 ppm difference around a 10 ppm MRL for a similar substance. Vigani et al. (2009), Drogué and DeMaria (2012), and Achterbosch et al. (2009) offer alternative scalar summary measures of dissimilarity of policies which still present either or both of these drawbacks.

An alternative to these heterogeneity indices, the frequency ratio is often used (Harrigan, 1993; Fontagné et al., 2005; Disdier et al., 2008). It calculates the coverage of NTMs of product categories relative to the total number of product categories of at aggregated level (say HS4 or HS2 digit) and weighted by production levels. Other aggregate or summary count proxies exist to provide an aggregate characterization of NTM regimes. These proxies do not provide much information on the stringency of NTM regimes (numerous lax NTMs, by count or frequencies, can be seen as more stringent than as a few exacting NTMs). See Li and Beghin (2012) for a systematic review of various NTM proxies and aggregators used in econometric investigations.

Traditionally many NTMs investigations have assumed NTMs impede trade (and implicitly decrease welfare) and rule out trade or welfare enhancing effects. However, it is increasingly recognized that market imperfections such as asymmetric information and production and consumption externalities abound and NTM policy interventions could increase welfare and may be trade-impeding or trade enhancing while increasing welfare (Beghin et al., 2012; Carrère and De Melo, 2011; Disdier et al., 2008; Disdier and Marette, 2010). NTMs may also be protectionist of course. Nevertheless, some agnostic priors on their protectionist nature ought to prevail. The empirical literature actually shows numerous cases of trade-enhancing NTMs (see Li and Beghin (2012) for a systematic review of that literature). There is no simple mapping between NTMs, their stringency, and their trade and welfare effects in presence of market imperfections.

To complicate further, market imperfections may justify some NTMs but do not exclude protectionism because the level of the chosen measure may be overly stringent, hence, protectionist by creating unnecessary frictions in trade. This is an increasing preoccupation in policy forums (Disdier and van Tongeren, 2010). Several investigations correlate frequency and trade frictions, without formalizing what is protectionism. For example, Disdier and van Tongeren (2010) make the conjecture that protectionism is responsible for some variance of incidence of NTMs across agri-food products. Disdier et al. (2008) posit that protectionism may exist when a SPS measure is enforced by only a few countries. Not looking explicitly at protectionism but rather at trade frictions, Winchester et al. (2012) investigate how bilateral stringency differences in NTMs affect bilateral trade. Reducing stringency differences to common lower stringency levels would increase trade; the welfare (allocative efficiency) grounds to do so are less clear, unless protectionism is presumed to prevail in the most stringent countries. These "conjectures" are intuitive, but lack formalism which we attempt to provide here.

Formalizing protectionism

When defining protectionism of NTMs one can start with the simple science-based test. In absence of scientific evidence establishing market imperfections or risk, a NTM is protectionist.[1] In presence of established risk or imperfections, identifying protectionism is more cumbersome.

More conceptually, Fischer and Serra (2000) provide a formal criterion for gauging protectionism in presence of market imperfection. They conceptually analyze the protectionism behavior of a local social planner (LSP) setting up a quality standard to lower a negative consumption externality. The authors define a standard as protectionist if its optimum level is higher under a LSP than under a global social planner treating all firms competing for the domestic market (foreign and domestic firms) as purely domestic. They find that when there a negative consumption externality the LSP always set the optimum domestic standard at a higher (protectionist) level than the level chosen by the global planner. The argument would be valid for a negative production externality as well. The Fisher and Serra results hinge on the domestic firms being more efficient at meeting the quality standard than foreign firms are. Marette and Beghin (2010) show that if foreign firms are much more efficient at meeting the standard, the domestic LSP will choose an anti-protectionist standard, lower than the global standard. Berti and Falvey (2009) extend the analysis of Fisher and Serra and incorporate rent seeking industries influencing the way the LSP sets standards. They investigate how rent-seeking and socially optimum standards vary from autarky to free trade. Rent-seeking under free trade between two countries promotes the harmonization of standards that were heterogeneous under autarky. Finally, earlier on, Baldwin (1970) defines a NTM as protectionist whenever it lowers global real income. The latter criteria could conceptually accommodate cases with market imperfections.

[1] There is a caveat of the precautionary principle which lets a country introduce a NTM while establishing the science. A precautionary policy without the pursuit of evidence is protectionist according to the WTO.